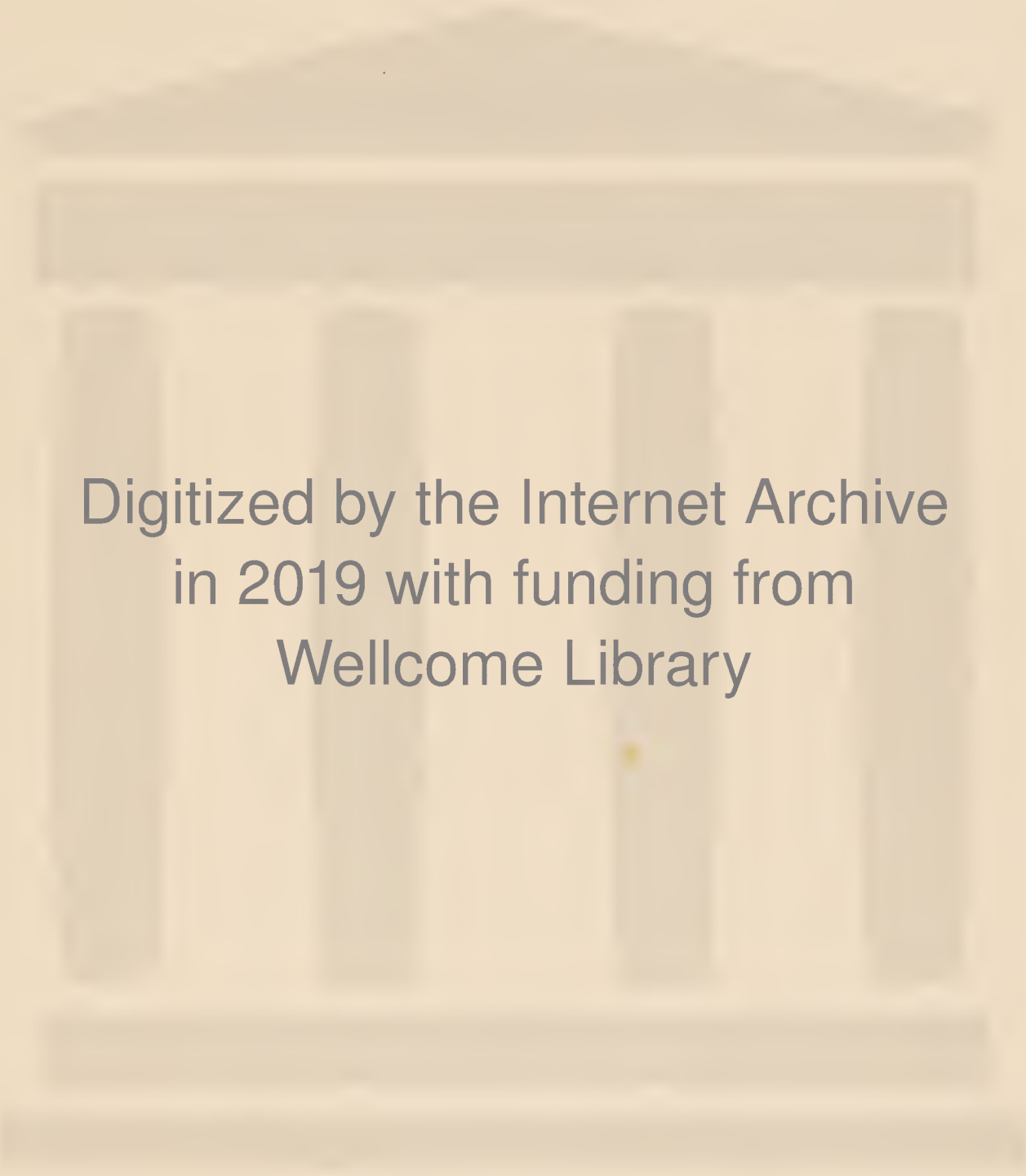


**British Society for the
Study of Orthodontics
1940-41**



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TRANSACTIONS

OF THE

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Study of Orthodontics

1940-I

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OFFICERS AND COUNCILLORS, 1940

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<i>Hon. Councillors</i>	{	Mr. H. C. APPERLEY (London Member). Mr. G. TAYLOR (Provincial Member). Mr. W. CHARLES (with charge of programme arrangements).
<i>Auditors</i>	{	Mr. W. L. BONESS. Mr. S. B. NEWTON.

Mr. H. R. EVANS was called up for war service at the beginning of the year, and the duties of Hon. Treasurer were undertaken by Mr. HAROLD CHAPMAN.

Mr. GORDON TAYLOR became Hon. Librarian on the resignation of Miss K. C. SMYTH in November, 1940.

OFFICERS AND COUNCILLORS, 1941

<i>President</i>	Mr. S. A. RIDDETT.
<i>Immediate Past-President</i>	...			Mrs. L. LINDSAY (with charge of programme arrangements).
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<i>Auditors</i>	{	Mr. W. L. BONESS. Mr. S. B. NEWTON.

Headquarters of the Society : Manson House, 26, Portland Place, London, W.1.

Communications should be addressed to the HON. SECRETARY, Mr. R. Cutler, 8, Lower Sloane Street, S.W.1 ; or 3, Walpole Road, Surbiton, Surrey ; or any other officer particularly concerned.

**DECISIONS APPROVED AT THE
ANNUAL GENERAL MEETING, 2nd DECEMBER, 1940,
AND RE-AFFIRMED AT THE ANNUAL GENERAL
MEETING, 6th DECEMBER, 1941**

1. The payment of subscriptions due on June 1st, 1941, to be deferred pending a further decision by the Council.
2. The Officers for 1941 to be the same as those for 1940.
3. Ordinary Meetings to be suspended until the Council decides otherwise.

The Normal Variations and Changes of Occlusion in the Dentitions of Children

By HAROLD CHAPMAN, L.D.S.Eng.

THIS Society has been seeking means whereby it may be more useful to its members. Suggestions have been made from time to time, but none have come to fruition.

Recently I suggested to the Council of the Society that a knowledge of THE VARIATIONS AND CHANGES OF OCCLUSION IN THE DENTITIONS OF CHILDREN WHICH TERMINATE IN NORMAL OCCLUSION IN THE ADULT is of the first importance, not only to members of this Society, but also to the entire dental profession.

Without a knowledge of what is normal at any age—whatever its appearance—how can one practise orthodontics as a profession? The words “whatever its appearance” are used to cover those varying alignments and relations of the teeth (some of these have the appearance of being severe irregularities) which terminate in the adult in “normal occlusion.”

The subject of this communication is one of everlasting interest because of its unending variety, and I am glad that the Council has agreed that one such case be shown at every meeting, by models as well as by slides.

I also suggested to the Council that the exhibition of serial models of untreated abnormal and treated cases would be valuable from the educational point of view. The serial models of treated cases should show the distant or delayed results as well as the immediate results: the one may have little relation to the other, as I have shown [I]. Such series of models provide the means to learn diagnosis and prognosis.

All such cases, illustrated with serial models, enable us to learn from actual clinical happenings, a much better foundation for treatment than theories which may not have any foundation.

Experience in practice tells me that communications based on the above suggestions provide some of the fundamental knowledge necessary to improve the standard of orthodontic practice.

I will recount a few of the incidents which lead to these conclusions:—

(1) Practitioners and students have great difficulty in diagnosing a case that is normal before all the permanent teeth are present and in good positions, even though it does not present any unusual features: what must the difficulty be when there are unusual features?

(2) Recently I saw an abnormal case in which the incisor alignment and relations were good: the removal of the two first upper premolars would have given a good result, leaving the lower arch somewhat crowded: one treatment suggested was to expand the upper arch and to remove a lower incisor; in other words, to

make one arch bigger and the other smaller. As the bucco-lingual relations of the molar series was correct, this treatment would have produced a condition in which the occlusal surfaces of the cheek teeth did not touch one another. Presumably, thought was given to alignment only, and it is doubtful if that would have been improved.

(3) I have been watching a child, now 7, for two years: she has very small arches and considerable imbrication of the incisors: I had advised the parents to defer action till the best treatment was more clearly indicated. The child has become an evacuee; another dentist has advised two Badcock plates at a very small cost, for which the mother anticipated the treatment would be completed.

(4) In another case it was suggested that premature loss of $\overline{c} \mid \overline{c}$ and $\overline{c} \mid \overline{c}$ was the cause of $\overline{d2} \mid \mid 2d$ being almost in contact; this might be so, but not necessarily so (Fig. 2 shows a case, L.H.358, in which early loss of $\overline{d} \mid \overline{d}$ had very little harmful effect). The treatment, implied, was to make room for the canines by expansion and perhaps forward movement of $\overline{21} \mid \overline{12}$, but if $\overline{6ed} \mid \overline{de6}$ had moved medially, those teeth should be moved distally to restore the space occupied by $\overline{c} \mid \overline{c}$; one frequently hears of attempts to correct such abnormal position by expansion instead of moving the tooth back to where it came from, particularly when a premolar has insufficient room.

The exhibition of serial models such as suggested would be a help to—an educational effort to help—practitioners who are faced with these difficult problems—some of them extremely difficult. It is only by repetition—not of the same cases but of cases shown by different members, and there are a number who have these—that any real and lasting value will be obtained by the members in general.

The following are some of the changes which may be observed:—

Closing of spaces between deciduous molars.

Closing of space between the upper permanent central incisors.

Opening the bite in (a) the deciduous dentition.

(b) the permanent dentition.

Increase of upper arch breadth.

Increase of lower arch breadth, but less than in the maxilla: and secondarily, correction of the imbrication of the lower incisors.

Forward movement of the lower arch in relation to the upper arch.

Rotation of all incisors.

Good position of the first permanent upper molars whereas originally they were tilted medially, so that the medio-occlusal edge was caught at the neck of the corresponding deciduous molar. (1A, 1B.)

Good position of the upper lateral incisor, followed by distal-tilting of its crown and later the lateral again in good position.

Doubtless there are many others, which will appear in the cases to be shown at subsequent meetings.

This paper is illustrated by two cases, other cases, No. 2377 [2]

and No. 2645 [3] showing greater changes, are already in the *Transactions* of the Society.

Case No. 6 (Fig. 1).—This is the first set of serial models I obtained (those at 4 and 9-2 were shown before the Society in 1914). I thought at that time that all cases followed the same plan, and in particular that imbrication of incisors might not be followed by their perfect alignment.

The following changes occurred in Case No. 6 : (male) (Fig. 1) :
Increased upper arch breadth.

Increased lower arch breadth, but less degree.

Medial movement of all the lower teeth in relation to the upper ones—this can be well seen by referring to the deciduous canines.

Closure of the space between the upper permanent central incisors.

Case No. L.H.358 (Fig. 2).—This case is of importance because it shows (i) that the early loss of deciduous teeth may not be followed by loss of space in normal cases as it appears to be in cases where the arches are small ; (ii) that the early loss of these teeth does not prevent arch breadth increase.

The only treatment was the wearing of a lower plate for twelve months between ages 7-1 to 8-1 years to preserve the premolar spaces ; observe that the premolars have either ample room or all but ample room.

The details of case L.H.358 (Fig. 2)* are :—

Between 3 and 4 years of age $\begin{array}{c} d \mid d \\ d \mid d \end{array}$ extracted—no models.

Age 6-6. 1st models. $\begin{array}{c} d \mid d \\ d \mid d \end{array}$ spaces reduced 3.3 mm. and $\overline{d \mid d}$ spaces 3.7 mm. as deduced from probable size of $\begin{array}{c} d \mid d \\ d \mid d \end{array}$ and $\begin{array}{c} d \mid d \\ d \mid d \end{array}$.

Age 7-0. $\begin{array}{c} e \mid \\ e \mid \end{array}$ extracted.

Age 7-7. { 2nd models. $\begin{array}{c} d \mid d \\ d \mid d \end{array}$ and $\overline{d \mid d}$ spaces no change : $\overline{ed \mid}$ space reduced .5 mm.

Age 6-6 { $\begin{array}{c} c \mid c \\ c \mid c \end{array}$ increase of arch breadth .75 mm.

to 7-7. { $\begin{array}{c} e \mid e \\ e \mid e \end{array}$ increase of arch breadth 1.50 mm.

{ $\begin{array}{c} 6 \mid 6 \\ 6 \mid 6 \end{array}$ increase of arch breadth 1.25 mm.

{ $\begin{array}{c} 6 \mid 6 \\ 6 \mid 6 \end{array}$ no change of arch breadth : $\overline{6 \mid}$ has moved medially.

Age 6-6 { $\begin{array}{c} 6 \mid 6 \\ 6 \mid 6 \end{array}$ increase of arch breadth 3.50 mm.

to 10-0. { $\begin{array}{c} 6 \mid 6 \\ 6 \mid 6 \end{array}$ increase of arch breadth 1.00 mm.

{ Incisor alignment improved.

Age 7-7 { Spaces between $\overline{26 \mid 62}$ increased 3.25 mm. ($\begin{array}{c} e \mid \\ e \mid \end{array}$ in

to 10-4. { *situ*) and 1.5 mm. respectively.

Age 7-1 } Lower removable splint plate worn at night.

to 8-1. }

Age 10-4. Almost perfect set of teeth.

* This case has been reported at a meeting of the European Orthodontic Society [4].

Notes on the premolar regions at age 10-4 :—

Upper right—no crowding.

Upper and lower left—very slight crowding.

Lower right—slight crowding.

It is difficult to teach what is to be learnt from a study of the serial models suggested: these same things are difficult to learn, whether by student or practitioner, so that repetition (not of the same cases) is essential. Few dentists have been taught these things, and to those who have learnt them repetition does not signify boredom, for it is not a repetition of detail—therein lies the fascination of the orthodontic problem.

As regards occlusion the normal, at the ages important to us, is different in each individual and differs from year to year; so the details to be learnt are many and can only be appreciated by studying numbers of serial models repeatedly.

In this way we shall be studying what Nature does and learning what is the result of our treatment, not contenting ourselves with reliance on theory. It will certainly enable us to give far better advice to our patients; though, in the language of to-day, we may not be such good salesmen, we shall be better professional men.

BIBLIOGRAPHY.

- (1) CHAPMAN, HAROLD. "When Orthodontic Treatment to Enlarge Arches is Indicated and other Details of Treatment in the Different Classes." *Trans. B.S.S.O.* 1938 (Fig. 5).
- (2) Idem. "Failures in Orthodontics." *Trans. B.S.S.O.* 1937 (Fig. 5).
- (3) Idem. "What is Normal as Regards Occlusion." *Trans. B.S.S.O.* 1938 (Fig. 4).
- (4) Idem. "Abnormal Vertical Position of the Deciduous Molars." *Trans. E.O.S.* 1937 (Fig. 2).

Discussion

The PRESIDENT said that the thanks of the Society were due to Mr. Chapman not only for instituting a series of communications in which it was hoped that other members would give their experience and judgment, but also for opening the series with such very instructive and interesting cases.

Miss K. C. SMYTH said she would like to thank Mr. Chapman for his very instructive communication and to ask him whether he had any suggestions to make as to how one could tell in what type of case the spaces would not close up after the early extraction of deciduous teeth and in what type of case they would close up.

Mr. T. JOHNSTONE thanked Mr. Chapman for his valuable communication. In the case in which Mr. Chapman had said that the patient wore a plate for one year, he would like to know whether it was merely a retention plate or whether it was a plate to produce any movement of the teeth.

Miss L. M. CLINCH said she thought that, in order to have a knowledge of the normal occlusion of the teeth, one required to have a knowledge of the normal developmental positions of the teeth before they erupted. In most of the cases shown by Mr. Chapman in which the teeth appeared to be irregular, it was simply, she thought, that they had erupted in the developmental positions rather than in the normal occlusal positions, and in time that naturally corrected itself. For instance, the upper central incisors were developed apart and sometimes they erupted in that position, but there was every likelihood that they would come together in time; it was, as it were, a delayed movement. It was the

Case No. 6. Age 4-9.

Case No. 6c. Age 9-2



Case No. 6c. Age 9-2. Case No. 6. Age 4-0 Fig. 1 Case No. 6e. Age 20-1



Fig. 1A

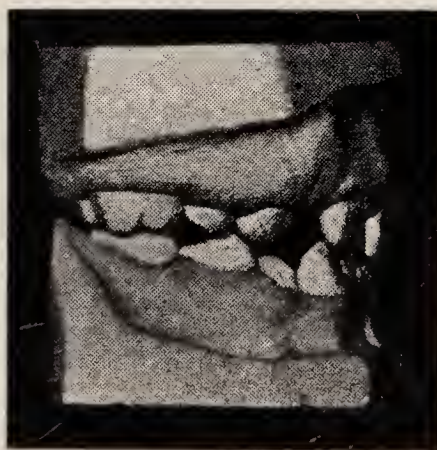


Fig. 1B

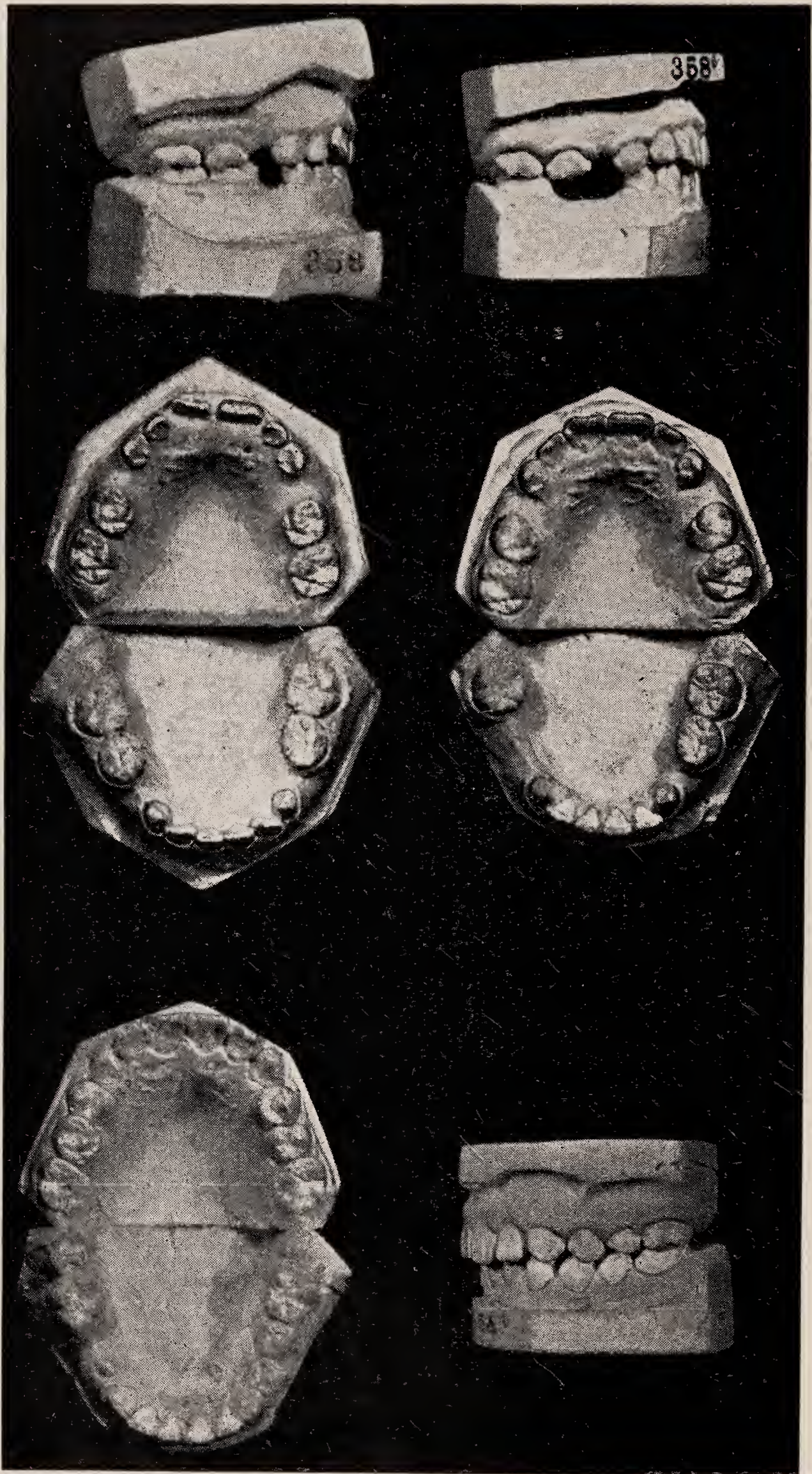


Fig 2.

same with the lateral incisors ; they developed behind the central incisors and as they erupted they tended to come forward all the time, but they might erupt slightly before the forward movement had taken place. Therefore it was important to know the normal developmental positions as well as the normal occlusal positions of the teeth.

Mr. J. STURROCK said he thought Mr. Chapman's communication was one of the most important that had ever been presented to the Society. A great many orthodontists were treating Class I cases by expansion, but it seemed to him Mr. Chapman had shown that that was very rarely justified. Orthodontics tended to fall into disrepute because of the large amount of treatment which was carried out and which achieved very little result. He thought one of the most valuable things the Society could do would be to put forward its views as to which treatments it approved of and which treatments it did not approve of. He would go so far as to say that early interference with Class I cases by means of expansion, either with Badcock plates or with lingual arches, was not justified, because if a good result ensued it had nothing to do with the treatment at all ; it would take place in any event. It was important that that should be widely known. During the last few years he had observed a number of cases, some treated by Mr. Chapman, some by his own predecessor in practice and some by himself, and in many of those cases the results of carefully carried out expansion were very disappointing. He remembered the case of two children for whom he had wanted to carry out expansion, but the parents had not agreed, and when those children were 18 or 20 years of age he had had to admit that the treatment would have been quite unnecessary. He thought that thousands of such cases had been treated and that orthodontists had wrongly been given the credit for the subsequent satisfactory condition of the mouth. He hoped that Mr. Chapman's communication would be given the widest possible publicity and that the Society itself would make a pronouncement on the treatments referred to in the communication, as it was very important for orthodontists to know what was worth doing and to do only that.

Mr. N. J. AINSWORTH said that in a paper he had read on a previous occasion he had shown a series of about sixteen models of a niece of his, taken from early years to adult life. She had started very similarly to the last case but one which Mr. Chapman had shown ; she was then a definite Class II case, with the central incisors slightly retroposed. The teeth gradually became less crowded ; at the age of 14 she became a Class I case and at the age of 15 or 16 she had a perfect set of teeth. He had seen her a year or two ago, and she was then getting imbrication of the two central lower incisors and a certain amount of upset in the perfect alignment of the upper incisors ; otherwise her arches were perfect. That either coincided with, or followed the eruption of the wisdom teeth. She was now 23 or 24 years of age. If he had ended his observations when she was 16 or 18, he would agree that her arches were perfect and that she had normal development, but there was obviously something wrong with her mouth, as she was not quite a perfect case at the time of the eruption of her wisdom teeth. He remembered one case which might be called a miraculous escape from being an orthodontic success. He had wanted to treat the case when the child was 8 or 9 years old but that was not possible, as the child was taken abroad. He came back after three or four years, and then had a perfect arch. He had a natural expansion of about 3.5 mm.

Mr. HAROLD CHAPMAN, in reply to Miss Smyth's question, said that, just as a man with a good constitution could do things with impunity which a man with a less good constitution could not do without be-

coming ill, so when a child had very good arches Nature seemed to permit of a certain amount of upset and disturbance without any serious results ensuing, but when a child had small arches the teeth behaved badly, as it were, and the disturbance resulting from any upset seemed very much greater than when there was normal occlusion. From the practical point of view, if one was able to see the child every three or six months one could tell whether the spaces were closing or not, and whether any treatment was necessary. With regard to the plate which one patient had worn for a year, he had not any details with him, but he had little doubt that it had been worn at night only ; certainly it had not been to move the teeth but only to keep the spaces. He agreed with Miss Clinch that the normal developmental position was important, but here again Nature allowed very considerable variation in cases of normal occlusion without malocclusion arising. Different cases had different clinical appearances ; in the first case, No. 6, that he had shown he thought the lower incisors had always been straight, but in the second case they had not been straight at one time : another normal variation is for one lower lateral to be inside the arch and the other outside ; both ultimately assume corresponding positions in normal cases but in cases of small arches their original developmental position (of malocclusion if one wishes to so describe it) is maintained. Sometimes the first permanent upper molar occupied such an unusual position as shown in the illustration (Fig. 1A). The first case of that kind that he had seen he had treated, but in the case illustrated, which he had not treated, the teeth had come into good positions without any interference (Fig. 1B). It was important to have a knowledge of all the developmental positions, and particularly to know which ones were not followed by malocclusion. He was sure that Mr. Sturrock had had very valuable experience. He agreed with him that expansion in Class I cases was of doubtful value and he now only increased the arch breadth in particular cases and for particular reasons. In a Class I case, with the cheek-teeth in correct buccolingual relations, one could wait to see whether the teeth had enough room and if they had there was nothing to be done ; if they had not, then extraction might be indicated. With regard to Mr. Ainsworth's question, he did not know whether the eruption of third molars had anything to do with the matter, but in the case of one of Mr. Northcroft's sons his arches had become narrower, with imbrication of the upper and lower incisors, when he was about 20 or 21 years of age.

A Contribution to the Study of Inferior Post-Normal Occlusion

By MATTHEW YOUNG, M.D., and
K. CORISANDE SMYTH, L.D.S.Eng.

Before embarking on the reading of this paper, I should like to make an explanation and an apology. As members may remember, the paper was to have been read last October, but was cancelled on account of the war. It was written in its present form by Dr. Young, with the idea that it should be added to by myself. It was my intention to illustrate various points of practical interest by slides of models, and possibly to measure up one or two cases typical of the kinds of post-normal occlusion which are described, and to compare these with the average values which are arrived at in the paper. But this was all shelved after war broke out, and when about a month ago, I was asked by your Council to provide a paper for this meeting, arranged at short notice, I could only consent to do so on the understanding that I should read the paper practically as written by Dr. Young, since my own war-time commitments leave me with little or no spare time. Therefore, my claim to joint authorship really rests almost entirely on that part of the research work carried out by myself, and not on the working out of the results, or their practical application.

However, it was Dr. Young's very special wish that I should read the paper, and for this reason I have pleasure in doing so. I know that you will share my regret that owing to continued and serious ill-health he cannot be present this evening. He has added a kind of post-script to the paper, which I shall read in due course. I trust that I may count on your indulgence for deficiencies which you may feel that I ought to have made good.—K.C.S.

MANY orthodontists have long held the view that valuable information regarding the characteristic features, the nature, and possibly the origin of that common abnormality, inferior post-normal occlusion, might be obtained by a detailed comparison of the average measurements of a comprehensive series of characters of the face and jaws in children showing the defect, with the measurements of the corresponding characters in children possessing the normal or ideal type of occlusion. Under the auspices of the Dental Disease Committee of the Medical Research Council it has been possible to carry out these measurements in relatively long series of children of both sexes with normal and post-normal occlusion respectively, ranging in age from 8 to 13 years, who were attending the elementary schools in the area controlled by the London County Council; this communication contains an account

of the main differences that were found in the two groups of children and our interpretation of them. We recognise that some may find in the differences observed evidence in support of other inferences than those drawn by us, but we hope that the more or less tentative conclusions set forth may stimulate and promote discussion of the results of the investigations by some of those familiar with the various manifestations of the condition, leading possibly to some increase of knowledge regarding it.

The measurements of the children from 8 to 13 years of age of both sexes with normal occlusion and of boys with post-normal occlusion at ages 8 to 9 years were taken by myself; the measurements of children from 8 to 13 years with post-normal occlusion, and of certain characters in children with normal anterior-posterior occlusion at these ages, were taken by Mrs. Johnson and Miss Still. The characters measured in some or all of the children are enumerated in the following list (Fig. 1). For various reasons it was impracticable to measure all the characters in all the children.

For brevity and convenience the characters are referred to in the tables, and often in the text, by symbols, also given in the list. The characters are grouped into (1) antero-posterior (radial), (2) vertical, and (3) transverse measurements of the face, (4) measurements of the dental arches, (5) measurements of the mandible, and (6) measurements of the teeth.

The definitions of the measurements given will be sufficient in most cases to indicate clearly their character, but in Fig. 2 are shown diagrammatically the principal antero-posterior and vertical measurements of the face that were taken.

It is impossible to describe in detail the instruments that were used for measuring the characters; for details we must refer you to the two M.R.C. reports (Nos. 171 and 225) in which they are fully described. We can only mention the principal ones and show these in some photographs. They include the Bennett prosopometer (Figs. 3, 4, 4*a* and 4*b*); calipers of various kinds including a type specially devised by myself for measuring the width of the dental arches (Fig. 5); a special instrument devised by Campion for measuring the length of the dental arches and the depth of the palate (Fig. 6); a special prosopometer for measuring the length of the mandible (Fig. 7); and two goniometers—one for measuring the size of the mandibular angle and the other (Fig. 8), described by Dr. Friel, for measuring the inclination of the central incisors to the molar-incisor, or occlusal plane, so modified by Sir Norman Bennett as to record the incisor inclination to the molar-canine plane.

It is fully realised that the series of measurements taken on individual children, though comprehensive and originally devised to give a fairly complete account of facial growth in different regions and different directions, may probably omit records of some characters which are important for a complete study of the abnormal condition under review. It is important to note that accurate measurements cannot be accomplished in the living child with the same ease as in the skull, and also that measurement in the living of some characters is difficult if not impossible.

<i>Characters.</i>	<i>Symbols.</i>
<i>Antero-posterior (Radial)</i>	
Transmeatal axis to nasion	TA to N
Transmeatal axis to upper incisor gum margin	TA to UIGM
Transmeatal axis to upper incisor incisal margin	TA to UIIM
Transmeatal axis to lower incisor gum margin	TA to LIGM
Transmeatal axis to mental point	TA to MP
Length of upper dental arch from behind first permanent molars	LUA
Length of lower dental arch from behind first permanent molars	LLA
<i>Transverse</i>	
Maximum bizygomatic breadth of face	Bizyg. B
Maximum bigonial breadth of face	Bigon. B
<i>Vertical</i>	
Nasion to sub-nasal point	N to SNP
Nasion to upper incisor incisal margin	N to UIIM
Nasion to occlusal surface of upper first molars (tips of medio-lingual cusps)	N to $\overline{6|6}$
Nasion to sub-mental point	N to \overline{SMP}
Lower incisors (incisal margin of $\overline{I|}$) to sub-mental point	LI to SMP
Lower molars (occlusal surface of $\overline{6|}$) to lower border of the mandible	LM to LBM
Palatal height	Pal. Ht.
<i>Arches</i>	
Maximum external breadth of upper dental arch at first deciduous molar or first premolar	B at $\overline{D|D}$ or $\overline{4|4}$
Maximum external breadth of upper dental arch at first permanent molar	B at $\overline{6|6}$
Maximum external breadth of lower dental arch at first deciduous molar or first premolar	B at $\overline{D|D}$ or $\overline{4|4}$
Maximum external breadth of lower dental arch at first permanent molar	B at $\overline{6|6}$
<i>Teeth</i>	
Length of left central maxillary incisor	L of $\overline{I|}$
Length of left central mandibular incisor	L of $\overline{I|}$
Length of overbite	
Inclination of central maxillary incisors to molar-canine plane*	Incl. $\overline{I|I}$
<i>Mandible</i>	
Mid point of bigonial axis to lower incisor gum margin	Go to LIGM
Mid point of bigonial axis to mental point	Go to MP
Angle between posterior rameal border and lower border of body of mandible	Go angle

* To the molar-incisor or "occlusal" plane in the preliminary investigation.

Fig. 1.

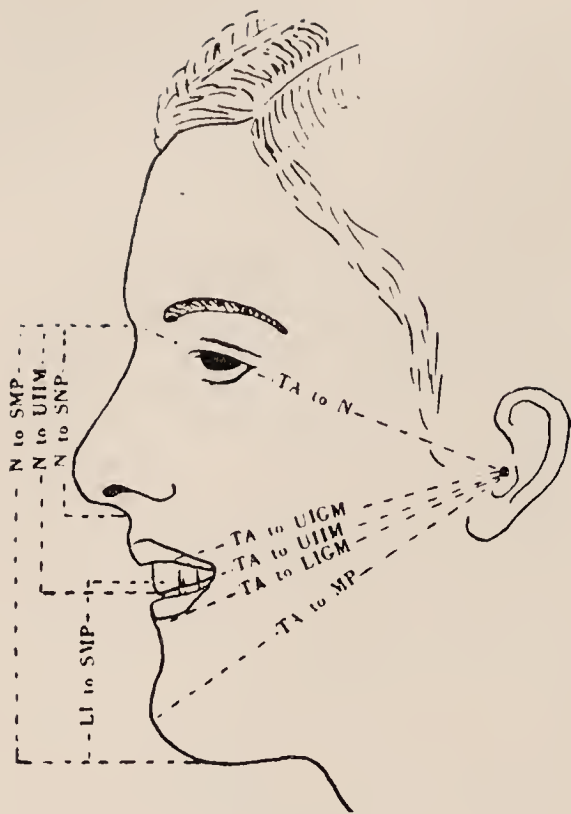


Fig. 2.

The principal antero-posterior and vertical measurements of the face that were taken are shown diagrammatically in Fig. 2.



Figure 3



Figure 4

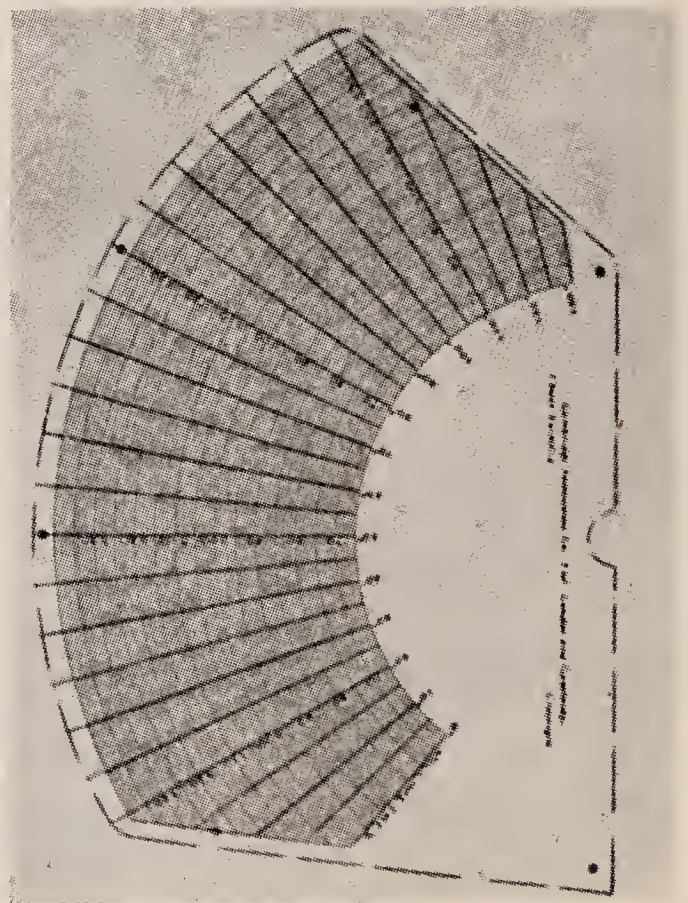


Figure 4a

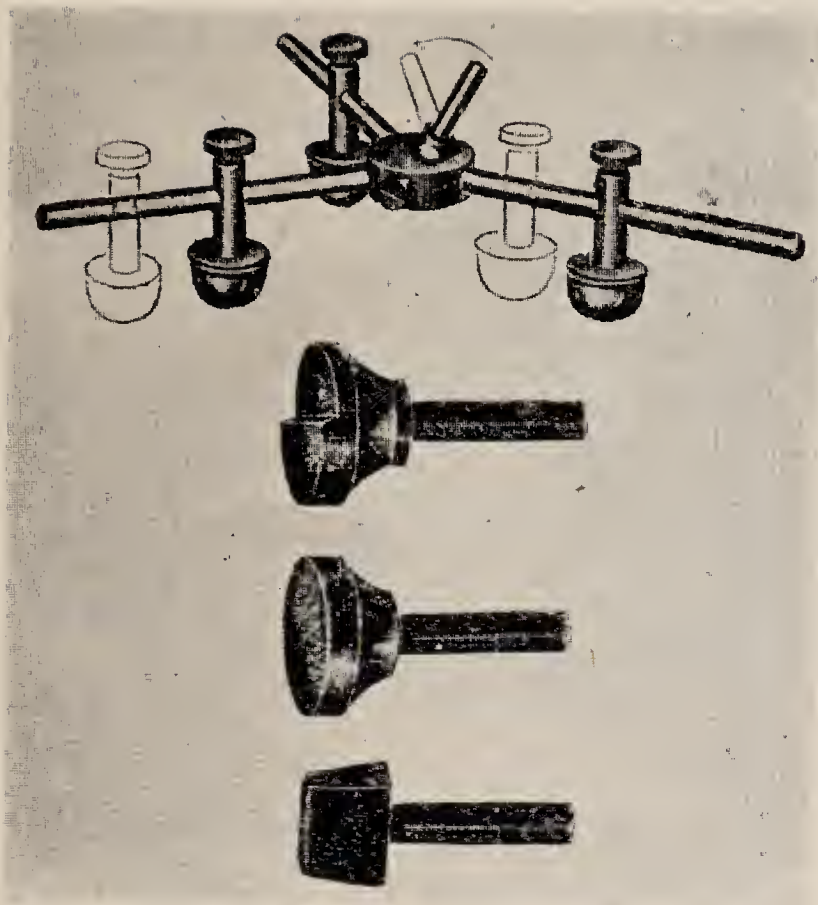


Figure 4b



Figure 5

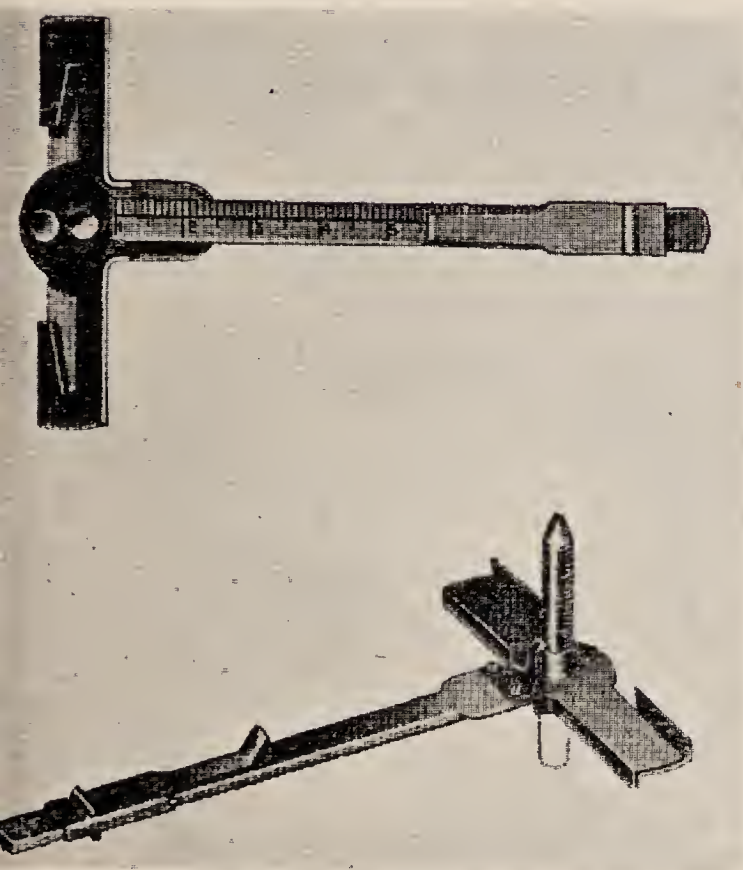


Figure 6

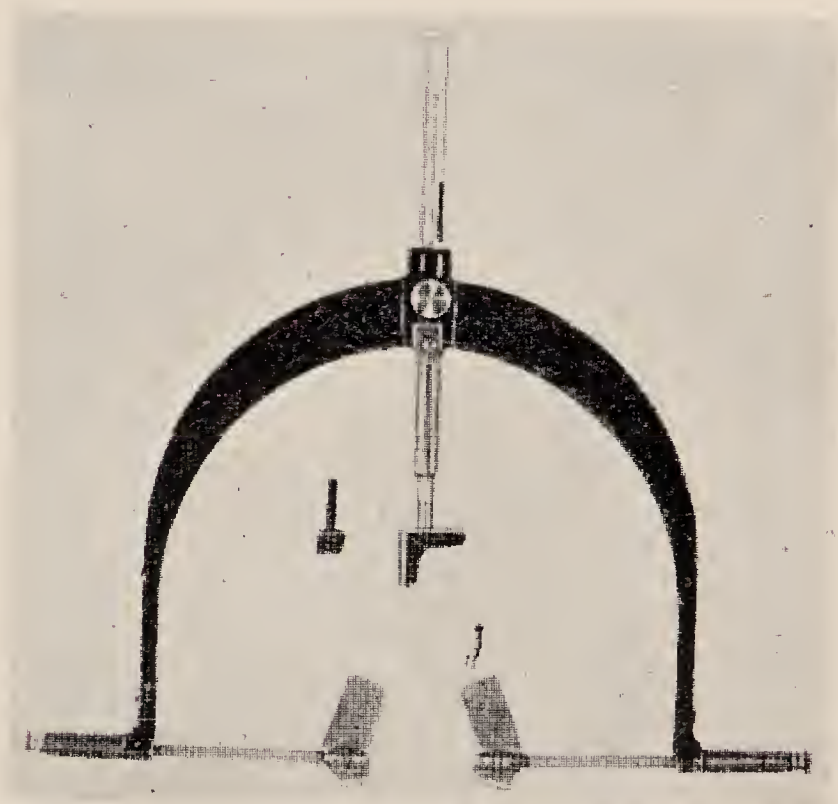


Figure 7

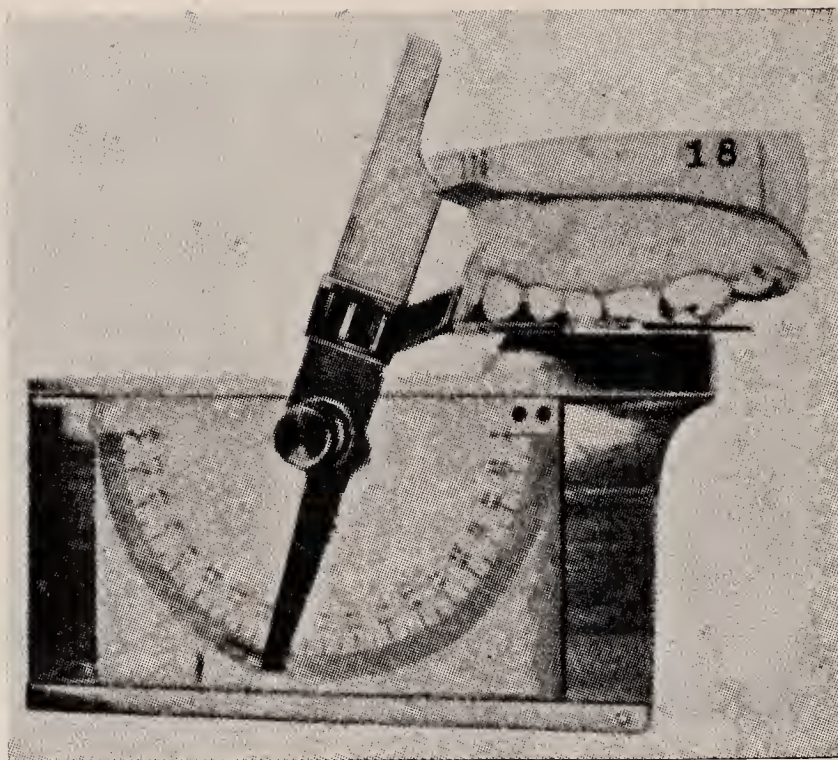


Figure 8

It will be convenient to describe the results of the inquiry in two parts : (1) the preliminary investigation in which the characters of the boys with inferior post-normal occlusion at ages 8 to 9 years (measured by myself) are compared with the corresponding characters in the boys with normal or ideal occlusion at these ages ; and (2) the main investigation wherein the characters in the boys and girls with post-normal occlusion at ages 8 to 13 years, measured by Mrs. Johnson and Miss Still, are compared with the corresponding characters in children at these ages with normal or ideal occlusion, measured by myself. The results in the preliminary investigation were of sufficient interest and importance to warrant the Dental Disease Committee of the M.R.C. recommending an investigation of the same nature but on a wider scale, the results of which are dealt with in the main investigation.

Exigencies of time and space forbid the demonstration and the detailed comparison in the normal and post-normal group of all the characters in the list which was tabulated and attention will mainly be directed to the principal differences that were observed. In the preliminary investigation, the characters in the post-normal group as a whole can not only be compared with those in the normal group, but also with the average values of characters in three different types of post-normal occlusion. Originally, an attempt was made to classify the models of the post-normal boys according to the subdivision of Angle's Class II, but it was found that many of the cases would not fit in under either subdivision, as the incisors showed no inclination in either direction. Therefore, with Sir Norman Bennett's assistance and advice, I classified these models into three groups or types, according to whether the central incisors were perpendicular to the occlusal plane, or in proclination or retroclination. Two of the types correspond with Angle's Class II subdivisions, Type II with Angle's Class II, division 1 (proclination), and Type III with Angle's Class II, division 2

(retroclination). Those cases with incisors perpendicular were called Type I, as they seemed to show the least degree of abnormality. These types will be referred to again later.

Comparing the post-normal group as a whole with the normal group we find from the radial measurements that while the average measurements from the transmeatal axis (TA) to the upper face, namely transmeatal axis to the nasion (TA to N), to the upper incisor gum margin (TA to UIGM) and to the upper incisor incisal margin (TA to UIIM) are all significantly greater in the post-normal than the normal, the measurements from the corresponding axis to points in the lower face, namely transmeatal axis to lower incisor gum margin (TA to LIGM) and transmeatal axis to mental point, (TA to MP), do not differ.

Considered generally, the figures suggest very strongly that it is an excess of forward growth in the upper jaw, rather than a retrusion or recession of the lower jaw, that differentiate the post-normal group as a whole from the normal in children of the age under review.

The mean dimensions of the width of the dental arches seem to indicate quite clearly that the dental arches, and especially the upper, are at both $4 \mid 4$ and $6 \mid 6$ narrower in boys with post-normal than with normal occlusion, and that the divergence from the normal is greater in the upper arch. In regard to length of dental arch, the mean value of the upper (LUA) does not differ in the two groups, whereas the length of the lower arch in the post-normal is significantly less than in the normal. The measurements of the face in the vertical direction suggest that the characters nasion to sub-nasal point (N to SNP), nasion to upper incisor incisal margin (N to UIIM), nasion to upper first molars (N to $6 \mid 6$), and nasion to sub-mental point (N to SMP), are greater in the post-normal than the normal boys; but when adjustments are made for difference of stature between the two groups (normal and post-normal) the divergences in the characters N to UIIM and N to SMP are not significant. Although no emphasis can be laid on any apparent excess in the full height of the face in the post-normal boys, it is of interest to note that there is no evidence of any reduction in comparison with the normal, at the age considered; a tendency to such a deficiency might be promoted by the prevalence of excessive close bite in the post-normals.

The palatal height and the depth of the mandible in front (LI to SMP) do not differ in post-normal from the normal. The depth of the mandible in the molar region (LM to LBM) appears to be rather less in the post-normal. Neither in bizygomatic nor bigonial breadth of the face can the post-normal boys be said to differ from the normal.

Attention may now be directed to the comparison of the several characters in the three types of post-normal occlusion into which the group as a whole has been classified from the inclination of the incisors. The main contrast is between the extreme types II and III with proclination and retroclination of the maxillary central incisors respectively and only incidental reference will be made to the intermediate form type I. The exclusion of cases of the

intermediate type from the more extreme types should accentuate the differences between these groups.

In the boys at ages 8 to 9 years the only one of the five antero-posterior characters (TA to N, TA to UIGM, TA to UIIM, TA to LIGM and TA to MP) which differs significantly in types II and III is TA to UIIM ; a relative excess in this character in type II might be expected from the method of differentiating the types from one another.

The breadths of the dental arches at $4 \mid 4$ and $6 \mid 6$ in the boys with post-normal occlusion of type II are greater than the corresponding breadths in type III but the average breadths at $4 \mid 4$ and $6 \mid 6$ in the respective types do not differ.

None of the vertical measurements of the face and jaws, including the height of the palate and the depth of the mandible, can be said to differ significantly on the average in the two types of post-normal occlusion.

The length of the lower dental arch (LLA) in the two types shows no difference on the average. The length of the upper arch (LUA) on the other hand is, as might be expected, definitely greater on the average in type II than in type III.

As a matter of interest the degrees of association that obtained between the corresponding pairs of characters of the face and jaws in the boys showing post-normal occlusion, and those found in boys at the same age with normal occlusion, were determined by the method of correlation to see if the inter-relationships shown differed in any appreciable degree. Out of 27 coefficients calculated there were only three instances in which they could be said to differ quite definitely. These were the coefficients for the characters TA to UIGM with TA to LIGM, LUA with LLA and B at $6 \mid 6$ with B at $6 \mid 6$. In these cases as might be expected the association is closer in boys with normal occlusion.

We now pass on to consider the results of the main investigation that in which the measurements of the characters in post-normal girls measured by Mrs. Johnson and post-normal boys measured by Miss Still at the individual ages from 8 to 13 years were compared with the corresponding characters in boys and girls at these ages with normal or ideal occlusion measured by myself.

It is a matter for regret that the measurements in the different groups to be compared were taken by different observers but as the collection of the material extended over several years it will be easily understood that it is not always possible for the same observer to work for as long as may be necessary to complete the investigation. We refer to this point now because we have to admit later the possibility that some of the differences found, for example in facial height, may have resulted from variance in technique used by the different observers, when one terminal of the measurement is not easy to locate accurately.

In addition to the characters of the face and jaws that had been measured, records of the height and weight of many of the children were made. On calculating the average height of the children at the different ages it was found that in all these groups the boys

and girls with post-normal occlusion were definitely taller than the children at corresponding ages with normal or ideal occlusion, although they came from the same schools. The average difference was as much as 4 to 6 cm. at many individual ages. As stature is positively correlated with many of the facial measurements, it was necessary to make some adjustment (deduction) in the mean measurements of the post-normal groups to make allowance for difference in stature. Sir Norman Bennett has often commented on the fact that in his experience children with post-normal occlusion seemed usually to be above the average in general intelligence. The mean figures for stature in the present investigation seem to indicate clearly that whatever functional impairment may be associated with the abnormality it does not interfere with the general physical development of those who possess it.

Attention will first be directed to comparison of the measurements in the children with post-normal occlusion, irrespective of type, with those in normal children; later the different types will be considered. It will only be possible to refer here to some of the principal differences; space will not permit discussion of all the characters that were measured.

With regard to the antero-posterior or radial measurements, we find that all three relating to the upper jaw (namely TA to N, TA to UIGM and TA to UIIM) are at all ages significantly greater in boys with post-normal occlusion than in boys with normal occlusion. Of the radial measurements in relation to the lower jaw, TA to LIGM is the more important. At the different ages the differences observed between the average values of this character in children with post-normal and normal occlusion respectively, are only such as would arise by chance. The slight deficiencies shown in average value of the character TA to LIGM in post-normal, as compared with normal, are quite overshadowed by the excesses shown in the character TA to UIGM in the post-normal as compared with the normal. Thus, comparison of the average divergencies of the characters TA to UIGM and TA to LIGM in the post-normal from the normal boys at the several ages, suggests that in the majority of cases it is a relative protrusion in the upper jaw, rather than a retrusion of the lower jaw, that characterises the post-normal relationship. The proportions of the boys in which one or other or both of these conditions are present can be determined approximately by predicting for each boy the dimensions of the characters TA to UIGM and TA to LIGM that might be expected, on the average, from the observed age and height (when height was given), by means of the equation connecting the three variables computed for the boys with normal occlusion (see M.R.C. sp. rep. ser. No. 171, p. 77). The predicted or "expected" values were then compared with the observed values, and the comparison brings out the fact that the measurement TA to UIGM is in excess of the expected value in 78 per cent of the post-normal boys, whereas the measurement TA to LIGM is in defect in 44 per cent. In 107 of the 161 boys with the character TA to UIGM in excess of the expected, i.e. 55 per cent of the total number 193, the character TA to LIGM was at least equal to the expected. Such a distribution

of the several conditions in the boys is strong evidence that, in this sex, protrusion of the upper jaw is more frequently an accompaniment of post-normal occlusion than is retrusion of the lower jaw.

In the girls with post-normal occlusion the character TA to N does not differ from the normal, but the characters TA to UIGM and TA to UIIM both exceed the normal definitely at most of the individual ages, though the difference from the normal is less emphasised than in the boys. On comparing the mean values of the character TA to LIGM in the post-normal groups at the several ages, with the corresponding normal measurements, they are seen to be definitely smaller. The average amount by which the measurement TA to LIGM in the post-normal is less than the normal is much the same as the excess shown in the character TA to UIGM in the post-normal over that shown in the normal. These results suggest that, while post-normality in girls seems to be associated with a significant reduction in the character TA to LIGM as compared with the normal, accompanying the retrusion of the mandible there is at the same time an increase in the post-normal values of the character TA to UIGM over the normal. Post-normality seems on the average to depend almost as much on a more advanced position of the upper jaw or arch as on retrusion of the lower jaw. Average results like these might arise from the occurrence of a mixture of cases in which either advancement of the upper jaw, or retrusion of the lower jaw only, was present, as well as cases in which both upper and lower jaws were involved.

The proportion of girls with post-normal occlusion in which these several conditions are present may be approximately determined, as in the boys, by comparing the observed values of the characters TA to UIGM and TA to LIGM in the individual girls, with the values that would be expected from their age and height as calculated by means of the appropriate equations. The comparison shows that in 141 out of 253 post-normal girls, 56 per cent, the character TA to UIGM is in excess of the expected, whereas the proportion showing the character TA to LIGM in defect is 177 out of 253, or 70 per cent. Of the 141 girls with the character TA to UIGM in excess of the expected, 75 had the character TA to LIGM either slightly in excess or equal to the expected. A protrusion of the upper jaw thus seems to be an important factor in relation to post-normal occlusion in girls, the proportion in which such a forward projection is found being but slightly less than that in which retrusion of the lower jaw occurs.

The relative reduction of the measurement TA to LIGM in the post-normal group may be due to antero-posterior shortening, or to a backward displacement of the mandible, or possibly an association of both features. Unfortunately, the means of estimating whether the main factor is shortening of the dental arch or mandible, or a change in its position, is not very satisfactory. There are measurements of three characters, Go to LIGM, Go to MP and LLA, however, in post-normal and normal groups which may give some estimation as to possible shortening of the dental arch and mandible as a whole, if not its alveolar portion.

In neither the boys nor the girls is there any definite evidence

that the estimates of the length of the mandible, Go to LIGM and Go to MP, differ in the post-normal from the normal.

In both boys and girls the length of the lower arch (LLA) in those with post-normal occlusion at the earlier ages is shorter than in those with normal occlusion but comparison with other groups of normal boys and girls from the same schools does not confirm this difference. In neither boys nor girls with post-normal occlusion does the length of the upper arch LUA differ from that in children with normal occlusion.

In the boys there is no definite evidence that either of the dimensions LI to SMP or LM to LBM in the post-normal differs from the normal, although at one or two ages a tendency for the post-normal to be in excess is present. The palatal heights in post-normal and normal do not differ. In the girls, comparison of the post-normal and normal averages of the characters LI to SMP, LM to LBM and the palatal height, at the several ages, leads, on the whole, to the same conclusion as in the boys.

The average external breadths of the dental arches at $\overline{4 | 4}$, $\overline{6 | 6}$ and $\overline{6 | 6}$ in the boys at all the individual ages under review with one or two possible exceptions, in the measurements at $\overline{6 | 6}$, are definitely less in the post-normal than normal boys. At $\overline{4 | 4}$, the breadth in the post-normal is also rather less than the normal but the deviations at the several ages cannot be regarded as established on the samples used.

In the girls, at all the individual ages from 8 to 13 years, the external breadths of the upper dental arch at $\overline{4 | 4}$ and $\overline{6 | 6}$ and the lower dental arch at $\overline{4 | 4}$ as well as at $\overline{6 | 6}$ in the post-normal groups are significantly less than the normal. In the lower arch the deviations between post-normal and normal averages show a tendency to be less than in the upper arch.

In the main part of the investigation, the measurements of facial height from the nasion in normal and post-normal children have not been deemed truly comparable, because the large differences observed suggests some variation in technique in identifying the nasion. If the differences actually found may be considered to indicate any tendency, it is that there is possibly some relative shortening of the face in the post-normals.

In the boys, both the bigonial and bizygomatic facial breadths in the post-normal are on the average significantly less than in the normal. The same tendency to be less than the normal is shown in the girls with post-normal occlusion, but the differences are not so large and not significant statistically at all the ages under review.

There is no definite evidence that the gonial angle is greater or more obtuse on the average in boys with post-normal occlusion. The same conclusion must be drawn from the results for the girls; an average excess of 2° in only two of the six age groups) though statistically significant, can scarcely be held to indicate a characteristic feature of post-normality.

In the main part of the investigation, the post-normal cases were classified into three types, not merely by an assessment in the dental arch models of the slope of the central incisors based on

personal judgment of the observer, but by the special goniometer already mentioned, designed by Dr. Friel and modified by Sir Norman-Bennett so as to measure the slope of the incisors to the molar-canine plane. The latter was deemed preferable to the molar-incisor (or occlusal) plane as the slope of the incisors is so variable in post-normal occlusion.

As the angle did not vary much, or consistently with age, in the girls or boys, a standard of comparison for the normal was obtained by measuring the corresponding angle in 50 models of subjects at varying ages showing normal occlusion, and taking the mean. This was found to be 92° . In the boys with post normal occlusion the average incisor inclination was also 92° . In the girls the average angle was 89° , i.e. 3° less than in the boys. The existence of such a difference in the sexes was not anticipated and its significance, if any, is not known. A classification into three types was made by arbitrarily fixing the angular range of the central or intermediate group (type I) as 2° on either side of the mean, thus, in the boys the angular range of the intermediate group (type I) was assumed to be 90° to 94° . Those in whom the angle of inclination of $\overline{I} \mid \overline{I}$ was less than 90° were thus considered to show proclination of the incisors (type II), those with an angle of 95° or over, retroclination of the incisors (type III). In subdividing the girls with post-normal occlusion into types, it was originally intended to use the same angular limits as in boys, but in view of the sexual difference found, and the importance of having approximately equivalent and reasonably adequate numbers in both the extreme types II and III, the observed mean in the girls, 89° , was taken as the centre of distribution, and a range of 4° around this angle, 87° to 91° , assumed to comprise the intermediate group with approximately perpendicular incisors. Girls with angles of inclination of $\overline{I} \mid \overline{I}$ greater than 91° were considered to have retroclined incisors and those with an inclination of less than 87° , proclined incisors.

Comparison of the characters will be restricted mainly to the types II and III, with proclined and retroclined incisors respectively, and only incidental reference made to the average values in the less well-defined intermediate type with approximately perpendicular incisors.

There is no evidence in the boys at the several ages with post-normal occlusion of type II that any of the characters TA to N, TA to LIGM or TA to MP differs from the corresponding character in type III. As might be expected, however, there is clear evidence that the measurement TA to UIIM is greater in type II. At one or two ages in the middle of the series the character TA to UIGM in type II also exceeds the corresponding character in the other type to a significant degree. In the girls with post-normal occlusion of type II none of the characters TA to N, TA to UIGM, TA to LIGM or TA to MP can be said to differ consistently on the average from the same character in type III. The character TA to UIIM in type II is again greater than in the other type with relative retroclination of the incisors, but it is only at age 12 years that the excess can be considered significant.

In the boys of type II in the main investigation the average breadths of the dental arches at $\overline{4 | 4}$ and $\overline{6 | 6}$ do not differ consistently from the corresponding breadths in type III, at some ages they are greater, at others less; at only one age, namely 12 years, is the difference established, when the average in type II is less than in III. At none of the ages can the breadth at $\overline{4 | 4}$ or $\overline{6 | 6}$ in type II be said to differ from that in the other type.

In the girls there is no definite evidence in the data for dental arch breadths at $\overline{4 | 4}$, $\overline{6 | 6}$, $\overline{4 | 4}$ or $\overline{6 | 6}$ that the average values differ in two types. In the boys there is evidence at some ages that the character LI to SMP in the type II form of post-normality exceeds the corresponding measurement in the other type, but there is no definite evidence of divergence in palatal height. In the girls with post-normal occlusion of type II there is no evidence that the average values of the depth of the mandible in front (LI to SMP), or the palatal height differ significantly from the corresponding characters in type III.

There is no evidence in the results for the boys that the upper facial height (N to UIIM) differs in the two types. The length of the lower arch (LLA) in boys with the two types of post-normal occlusion shows no difference on the average, the length of the upper arch (LUA), on the other hand, is, as might be expected, definitely greater on the average in type II than in type III.

The average values of Go to LIGM and Go to MP, the estimates of the antero-posterior length of the mandible in the groups of boys with post-normal occlusion of types II and III do not differ consistently in direction or vary appreciably in extent. Little importance can be attached to the differences found.

The main result of the investigation is to provide very suggestive if not conclusive evidence that the origin of inferior post-normal occlusion in the great majority of the boys, but in a smaller proportion of the girls examined, is essentially dependent on the degree of forward growth or the position of the upper jaw, and not on retrusion of the mandible. When protrusion of the upper jaw and retrusion of the lower co-exist, the proportion in which protrusion is the most prominent feature is, in both sexes, equal to that in which retrusion predominates. Children with the two principal types of post-normal occlusion do not appear to show significant differences in any of the characters brought under review unless it is in the two, transmeatal axis upper incisor incisal margin (TA to UIIM) and the length of the upper dental arch (LUA), in which the divergence largely depends on the mode of differentiation of the two types.

POSTSCRIPT BY DR. YOUNG.

In an attempt to gain more reliable and more precise information regarding the normal and abnormal growth of the face and jaws in early childhood than is obtainable from external measurements, we have taken standardised radiographs of the profile and full views of the heads of 200 children from 5 to 9 years. The radiographs have been repeated at six monthly intervals. Although many measurements have been made on the radiographs, the analysis of the data is unfortun-

ately not yet far enough advanced to permit of any conclusions being drawn. We are hopeful, however, that the investigation will provide many interesting results.

One of the most prominent members of this Society in a review of the account of the earlier investigation has expressed the opinion that work of this nature was probably more of academic interest than of practical importance. Though we respect this point of view and admit that there may be some slight justification at the present time for its receiving the support of some orthodontists, it must not be forgotten that though for years pure research may seem only academic—the amassing of knowledge for knowledge's sake—one day one bit of knowledge thus acquired will most probably help to provide the key to solve some problem.—M.Y.

Discussion

The PRESIDENT said the members were to be congratulated on the fact that the war had not deprived them, as it was thought at first would be the case, of the pleasure of hearing the paper which Miss Smyth has just read. He was sure they would join with him in asking Miss Smyth to convey to Dr. Young their best wishes for his complete restoration to health and also their thanks for his paper. Obviously such a communication depended for its success on the labours not only of those responsible for the paper but also of those who had contributed over a period of years to the constant measurements necessary, and there was no need for him to say how valuable that work was.

Miss L. M. CLINCH read the following contribution to the discussion from Dr. S. Friel :—

“The investigation carried out by the Medical Research Council on the nature of post-normal occlusion is of tremendous importance to orthodontists, and we cannot be too grateful for the painstaking efforts of the two authors of this paper, as well as the investigators who carried out the measurements. The astonishing result that came out of the investigation was that post-normal occlusion need not be a post-normal occlusion at all but may be rather a pre-normal upper. It is also astonishing that there should be such a difference between boys and girls, the boys being upper pre-normal in such a large percentage of cases and the girls being lower post-normal in a large percentage.

Such statistical investigations cannot be applied by the clinician, but they do make him realise that his diagnosis of these conditions must be much more carefully carried out, and I personally believe that I have greatly benefited from this research. It appears to me that the relationship of the teeth which we call post-normal is probably a common symptom of many very different types of malformation, their origin, development and response to treatment being very different. There are two types that I think I can recognise, and it is possible that the first of these two types can be again sub-divided into true post-normal and pre-normal uppers.

The first type would be the congenital malformation which has been shown by Miss Clinch to occur at birth. The second type might be called an acquired post-normality. The deciduous teeth can be in their correct relationship at three years of age, and if they maintain that three-year relationship at eight years of age the permanent molars must be in a post-normal relationship. The characteristics of this latter type are lack of lateral growth, especially between the canines, lack of wear of the cusps and rotation of the upper first permanent molars. These cases respond in an extraordinary manner to treatment

of the upper arch only ; that is, lateral expansion, rotation of molars, and sometimes grinding of points of deciduous canines. The removal of these obstructions allows the lower teeth to move forwards through the bone, and no interference of any kind with the lower teeth is necessary. The response to treatment of the congenital type is very different and the treatment is much more complicated. In some cases undoubtedly a better result is obtained by the removal of the upper first premolars and the bringing back of the canines and incisors ; in other cases a better result is obtained by bringing the lower teeth forwards. It is difficult to put into words the methods that are adopted to differentiate these two classes of congenital post-normality. At present one has to depend to a great extent on observation of the facial bones.

In this paper Dr. Young and Miss Smyth have devoted a considerable amount of space to a classification of post-normal cases according to the inclination of the upper incisors, but I am afraid that the method suggested by Sir Norman Bennett for determining this inclination does not seem to me to be entirely satisfactory. To determine any relationship in the head is very difficult, on account of the great variation of all anatomical points. Some points or planes are better than others. The molar-canine plane does not seem to me to be one of the good planes from which to measure the inclination of the incisors, for two reasons : first, it varies greatly in relation to the other parts of the face and bears no relation to the profile, and, secondly, it changes with age. If one asked the man in the street whether so-and-so had leaning out or in incisors, he would judge such inclination from the relationship of the teeth to the profile. Therefore, if a plane can be found that bears a close relationship to the profile it will be a very much better plane from which to measure the inclination of the incisors than the molar-canine plane.

For about ten years I have used the Frankfort Plane, as I thought it was approximately horizontal when the head was held erect, and I have measured the inclination of the incisors to this plane with an instrument which Mr. McKeag and I showed at a meeting of this Society in 1932. Early last year Miss Clinch, Mr. McKeag and I carried out a small investigation to see how horizontal the Frankfort Plane really was. We examined 35 girls of varying ages with approximately straight teeth. The child stood erect, and the line of the Frankfort Plane was marked on the face. Mr. McKeag and Miss Clinch independently viewed the child, standing erect, through a glass fixed on a movable stand, upon which was drawn a horizontal line. The height of this line from the floor was made the same as the height of the Frankfort Plane from the floor. A protractor was also fixed on the glass to enable the angle of the Frankfort Plane to the horizontal to be read. The Frankfort Plane was fairly uniform with the horizontal or a few degrees downwards, as would be expected in children. Some of the extreme cases upwards seemed to be due to the head being carried with an upward tilt. The extreme cases in the other direction also seemed to be due to keeping the head down, either from general meekness or general physical weakness. Taking 0° as the horizontal, four cases had an inclination of 2° , 4° , 5° and 6° above, one case had an inclination of 10° below, and all the others had an inclination between 0° and 6° below. Photographs were taken of six of these children, two with the Frankfort Plane inclined upwards 5° and 6° above, one at the average 2° below, and three inclined downwards 10° and 6° below, to see whether the Frankfort Plane bore any relation to the profile. I first show each child as she stood.

Dr. Sheldon Friel's Illustrations



Figure 1

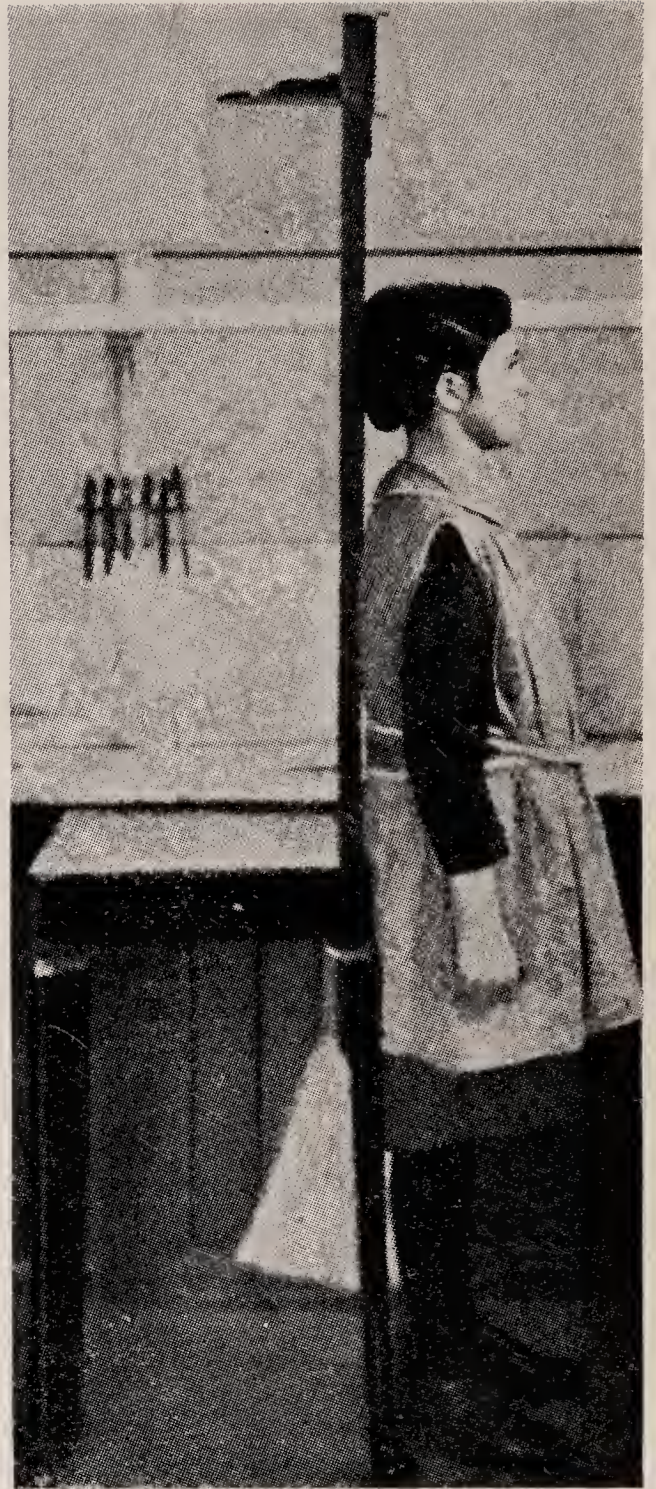


Figure 3



Figure 2



Figure 4



Figure 5



Figure 7



Figure 6



Figure 8



Figure 9



Figure 11



Figure 10



Figure 12



Figure 13

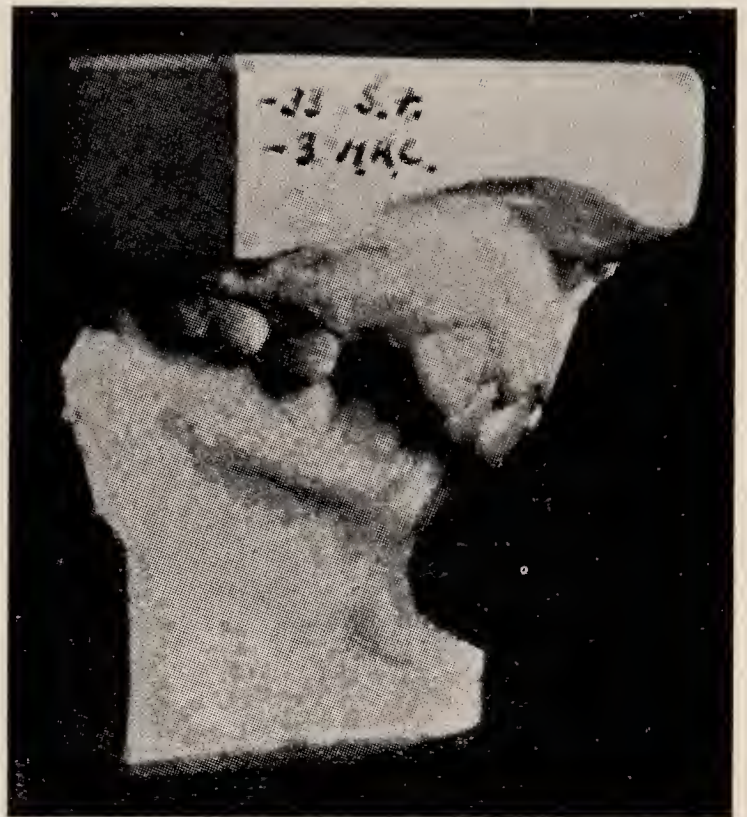


Figure 15

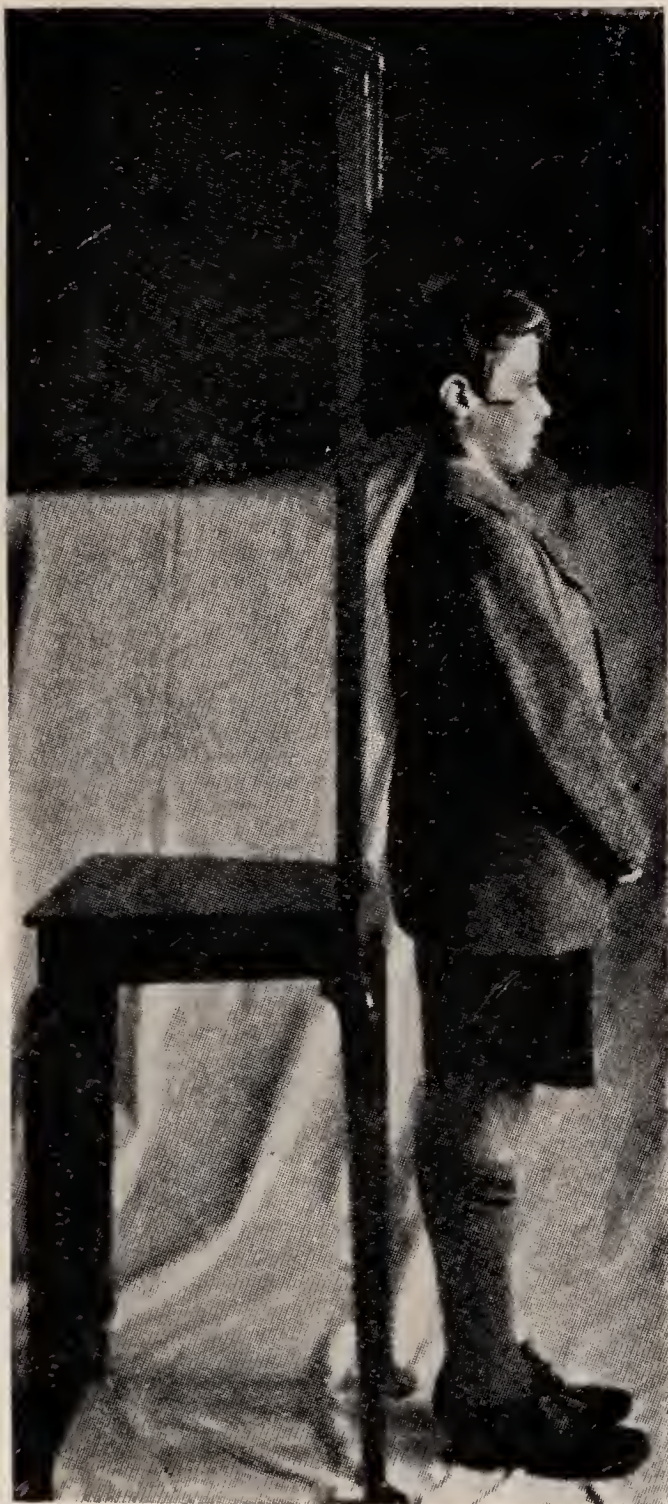


Figure 14



Figure 16

In the first case the plane is definitely directed upwards, 6° above (Fig. 1). I have had an enlargement of the head made and placed the Frankfort Plane horizontal, and I think it looks at right angles to the profile (Fig. 2). Fig. 3 shows the second case, 5° above. In the enlargement (Fig. 4) the Frankfort Plane is very little off the right angle to the profile and not as much as the first picture would indicate. The next subject (Fig. 5), the average one, 2° below, stands well and holds the head well. The Frankfort Plane is almost at right angles to the profile in the enlargement (Fig. 6). Figs. 7 and 9 show the next two cases, 6° below. The Frankfort Plane seems to be not far off right angles to the profile (Figs. 8 and 10). The last child (Fig. 11), aged seven years, was undersized, gone at the knees, and generally stood badly. The angle is 10° below. I do not think the enlargement would put the angle down so low (Fig. 12).

Miss Clinch, Mr. J. W. Softley and I carried out a further investigation at a school of 45 boys. All the boys were photographed and enlargements were made. A very different result was obtained from that found in the case of the girls. The Frankfort Plane was horizontal in 18 cases, 19 were up to 6° above, and only eight were up to 7° below. In the 35 girls, nine were horizontal, four were above up to 6° and 22 were below up to 10° . It looked as if the boys were bold as brass and held their heads up. The photographs showed a very similar result to that in the case of the girls, but it would take a whole paper to analyse them. If it is conceded that the Frankfort Plane is approximately stable and that the variation of all other planes or angles to this plane is very considerable, then it would seem to be the best plane from which to measure. The angle of the incisor-molar plane to the Frankfort Plane varies from -3° to $+25^{\circ}$, but there is just a general tendency for the incisors to vary in keeping with the incisor-molar plane. In Dr. Young's and Miss Smyth's paper the normal inclination of the incisors to the canine-molar plane was given as 92° . Those in whom the angle inclination was less than 90° were considered to have retroclination of the incisors, and those with an angle of 95° or over were considered to have a proclination of the incisors.

Figs. 13 and 14 show a case of my own. The angle of the incisors to the canine-molar plane was 69° , so that according to the Medical Research Council's Report the incisors leaned out $+21^{\circ}$. According to my method the incisors leaned out only 6° , a difference of 15° . In another case (Fig. 15), the angle of the incisors to the canine-molar plane is 98° , so that according to the Medical Research Council's Report the incisors lean in -3° . According to my measurements, the angle of the incisors to a perpendicular from the Frankfort Plane is 33° , showing a difference of 30° . If this model is viewed and the incisors were leaning in only -3° , as the Medical Research Council method indicates, the molar teeth would be below the level of the incisors. This undoubtedly is not the case with the individual. Her incisors appear to be leaning right back. The upper model in Fig. 16 has the top cut on two planes, one which is parallel to the Frankfort Plane and shows the incisors leaning in 20° , the other parallel to the canine molar plane and shows the incisors leaning in only 4° . I should like to thank the authors of the paper very much indeed, and I trust that Dr. Young will soon be restored to health."

Mr. HAROLD CHAPMAN said that one could have nothing but admiration for the amount of work which had been necessary to produce the Report which was the subject of the paper. There was so much that might be discussed in the Report that he would confine his remarks to features of importance which he felt called for criticism, and such criticism, if it had any foundation, would have a bearing on the value

of the Report as a whole. The Report said that in the cases (post-normal) dealt with, the arches, both upper and lower, were narrower than normal, but if they were both narrower it seemed to him that the Report was dealing with cases which combined symptoms of Class I and Class II cases. There are a number of cases of post-normal occlusion with what he would call good arches, the upper one being narrow only to compensate for its relation with the lower. He had made it clear in a previous communication (1) that post-normal cases might have arches of the correct size (Figs. 2, 3, 4 and 5), and then they might be called pure Class II cases, but they might have small arches, in which case a Class I abnormality was combined with a Class II, or post-normal, abnormality (Fig. 1): these are two irregularities which are not necessarily related to one another. (By a Class I case he wished to convey the idea of a case in which the maxillary and mandibular bases and the maxilla and mandible were too small to contain the teeth in good alignment.)

Four post-normal cases which have very good lower arches are shown in Figs. 2 to 5: in each case the upper arch is slightly narrow to compensate for the relation of the lower one to it. The upper incisors in the case shown in Fig. 2 appeared almost vertical in the mouth. He mentioned that because he did not think that the inclination of the upper incisors in Class II, Division I cases had any bearing on the question of post-normality, and, therefore, he suspected that the issue was confused by that point being introduced. The results of the investigation would have been much more convincing if it (the investigation) had been confined to cases with (i) lower arches of normal size and (ii) vertical upper central incisors, instead of including in it cases with upper central incisors in various degrees of proclination as well as vertical ones, and again, others in retroclination. Fig. 2 shows a case in which the lower arch is very good; the teeth are in correct buccal-lingual relationship and, therefore, so far as the width of the upper arch is concerned, its narrowness is compensation for the position of the lower arch in relation to it. There is an excessive overbite. The facial appearance does not give the impression of proclination of the upper central incisors to the extent that the illustrations do—in any case, it seems much less than in Figs. 3 and 5. In Fig. 3 there is a very good lower arch. The upper incisors are in definite proclination: there is an excessive overbite. Fig. 4 is a post-normal case, Type 3 of the Committee, or Class II, Division II. The lower arch, as in the two previous cases, is as good as would be expected in a case of normal occlusion. Fig. 5 shows another post-normal case with a good lower arch. It is interesting because it combines Type 2 and Type 3 of the Report. If the Committee's statistics were based on post-normal cases with lower arches of normal breadth and post-normal cases with narrow arches without any distinction (he had not been able to find any distinction in the Report), he thought they had confused the issue by mixing up types of irregularities which probably had no bearing on one another; one result of this would be to give a lower figure for lower arch breadth (according to the Report, this is one of the features of post-normal cases) than would have been the case if only what he had called pure Class II cases had been dealt with. In one of the Committee's groups, the distance between the lower incisors and the lower border of the mandible and between the lower molars and the lower border of the mandible was the same as in cases of normal occlusion. There probably are a few clinical cases which comply with that, but the majority of the cases that he met certainly would not do so. In such a case, unless there was some compensating abnormality, there would be no excessive

overbite, and it was well known that clinically excessive overbite was present in the great majority of these cases. Some explanation on this point seemed essential if reliance is to be placed on the statement relating to it.

The Report is vague in regard to the length of the arches. The length of the arches varies according to what teeth are present, whether the deciduous molars are present or whether they have been lost, replaced by pre-molars and the spaces partially or entirely closed by a forward movement of the molars. He had not been able to find any mention of this detail in the Report but it was one which had a direct bearing on the length of the arches—particularly the lower one. A further factor which had a bearing on arch length, as on arch breadth, was whether the arch was normal in size or smaller than normal (as in Class I cases). This is another source of discrepancy which arises as a result of the inclusion of cases having the characters of Class I in the investigation. He could not be quite sure whether Type 2 and Type 3, or Class II, Division I and Class II, Division II, should be considered in the same category or not. Sometimes he thought they should be, because one could push in two upper central incisors against the lower teeth and convert a Division I case into a Division II case and by pushing the upper central incisors forward, a Division II case can be given the appearance of a Division I case, but if one compared models of the two divisions with all the deciduous teeth present, the two types appeared to be entirely different as they did when only permanent teeth were present. The relative positions of the upper permanent central and lateral incisors seemed to indicate different developmental positions of these teeth in relation to one another in the two divisions. He had an open mind on this point, and he showed slides with regard to it, so that members might give it their consideration. Fig 6 showed a Class II, Division I case at age 6 years 7 months, and Fig. 7 showed a Class II, Division II case at age 7 years 5 months and 10 years 9 months; there had been no treatment.

As he had said, he was unable to make up his mind whether there was really any relation between the two types of irregularity, but certainly the illustrations seemed to indicate that they had no connection with one another except in their post-normality; the shape of the upper arch was different in the two divisions of Class II at all ages. (Figs. 2, 6 and 7). He had wondered whether the difference was brought about by a different developmental position of the upper permanent laterals in relation to the upper permanent centrals, so that the laterals erupted *in* or *inside* the arch in one case, and *outside* it in the other, so that they overlapped the centrals; the differences were readily appreciated if one compared cases, the permanent upper laterals having erupted, which combined small arches and post-normality (Figs. 1 and 7). Perhaps the points mentioned are details in two different syndromes, the shape of the maxillary base being the foundation of each. With regard to the question of the height of the children, those with post-normal occlusion were said to be taller and also slightly heavier, so that their tallness would appear to be associated with a compression laterally. If the children had been considerably heavier it might be imagined that their breadth had increased as well as their height, but it seemed that they had the quality of tallness without increased breadth and this might be brought about by a compression of the whole body and so result in narrower and longer arches (than in normal cases) with the teeth in good alignment, the upper arches having the quality of (additional) narrowness to that slight degree necessary to compensate for the post-normal position of the lower arch in those cases in which the lower arch is normal in size.

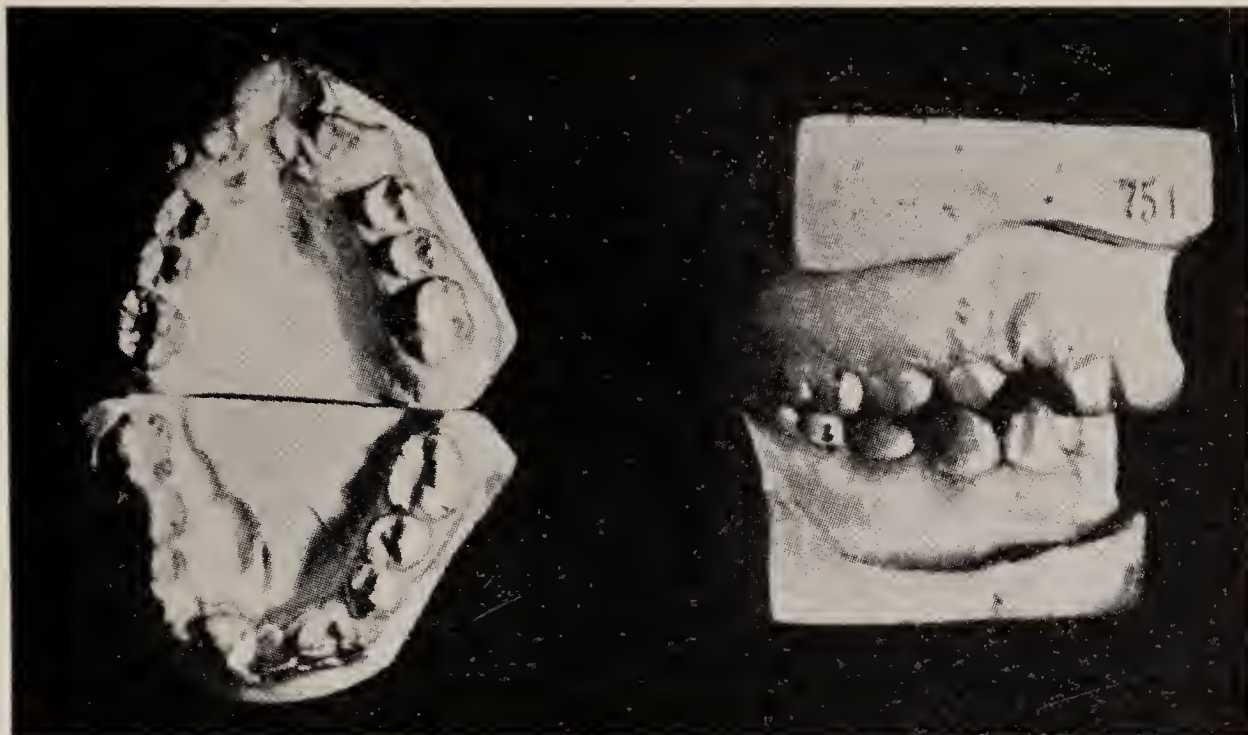


Figure 1



Figure 2

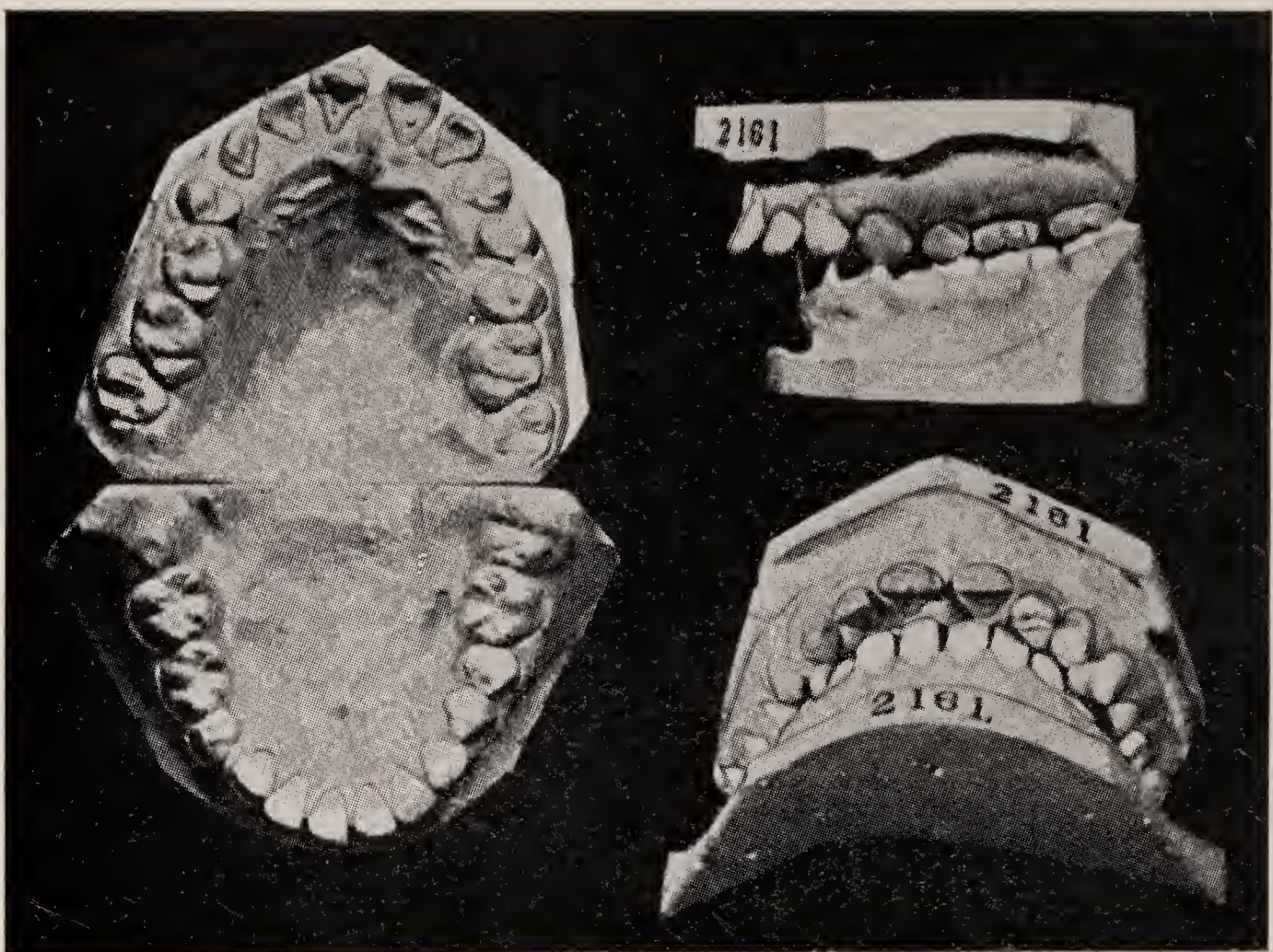


Figure 3

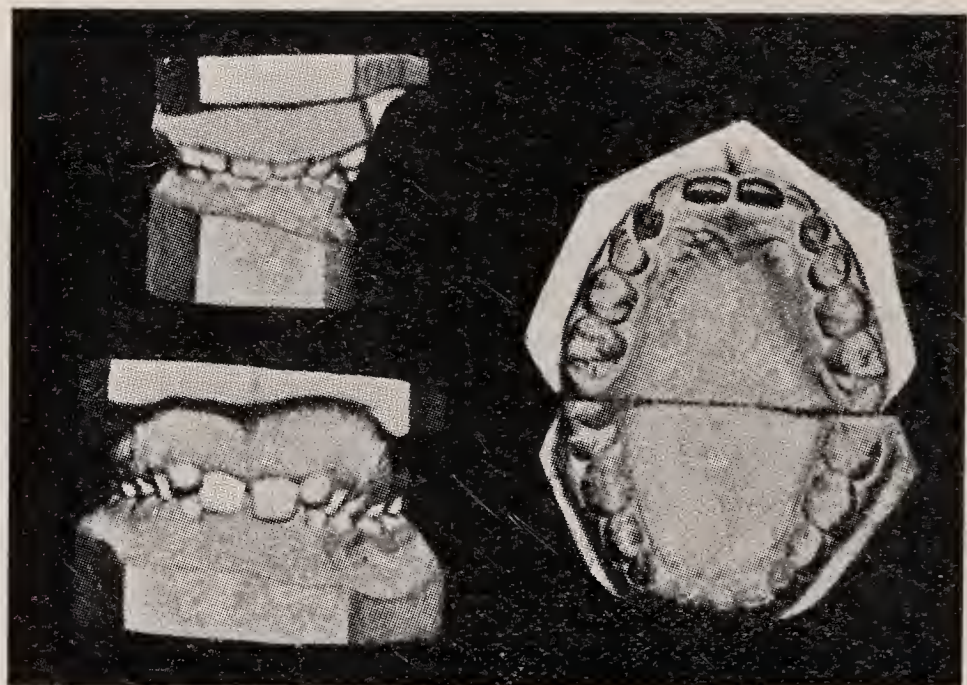


Figure 4

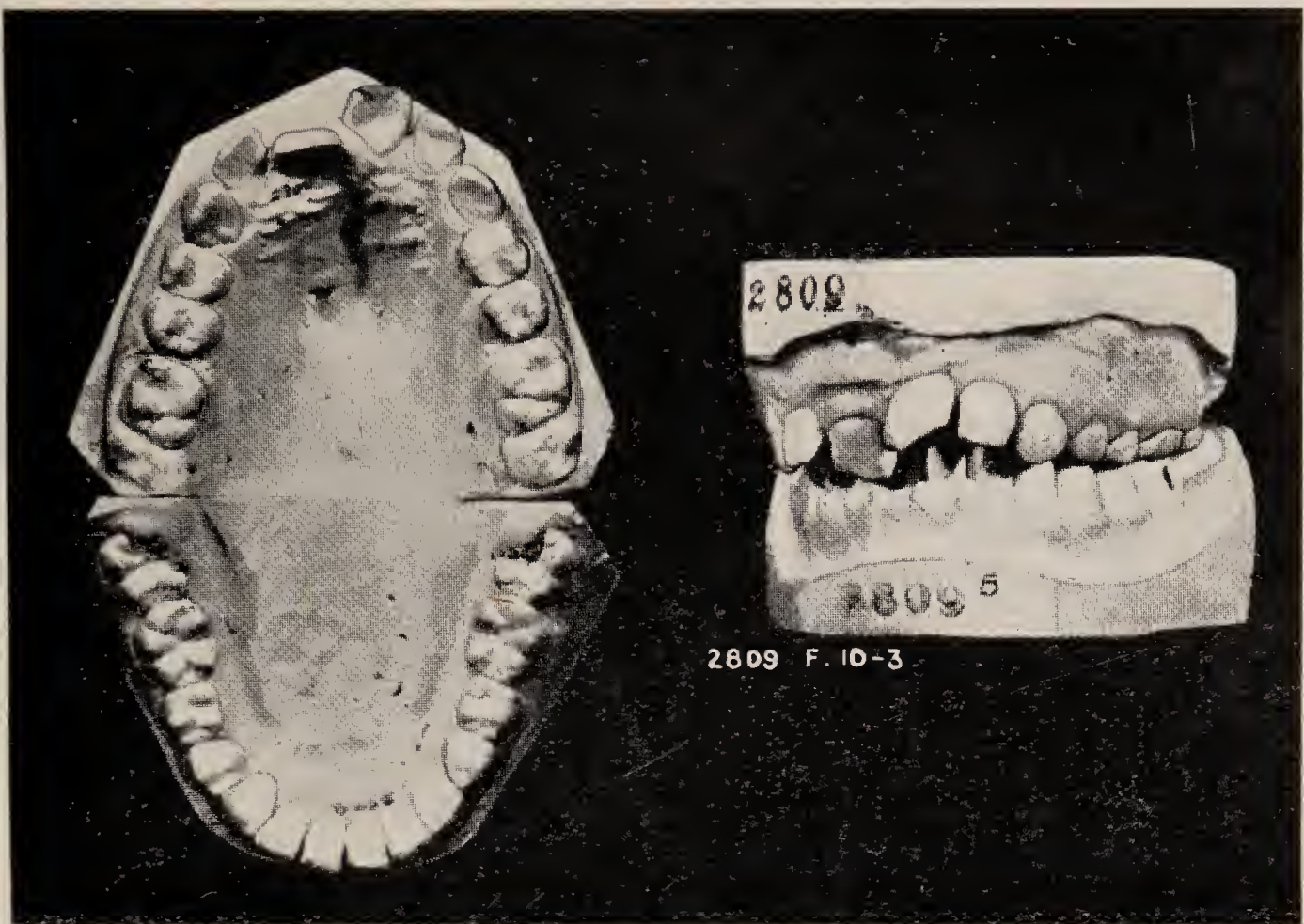


Figure 5

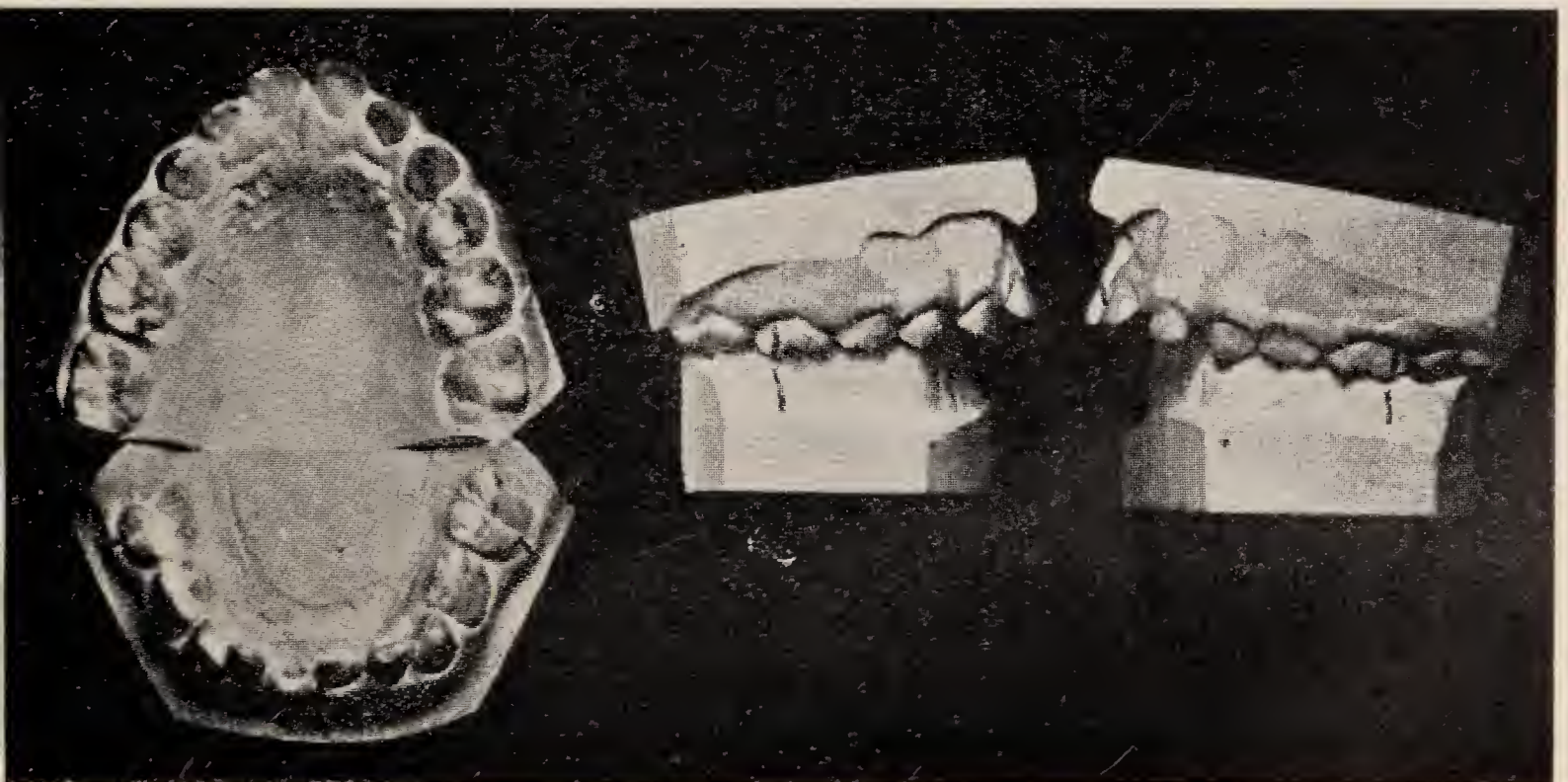


Figure 6

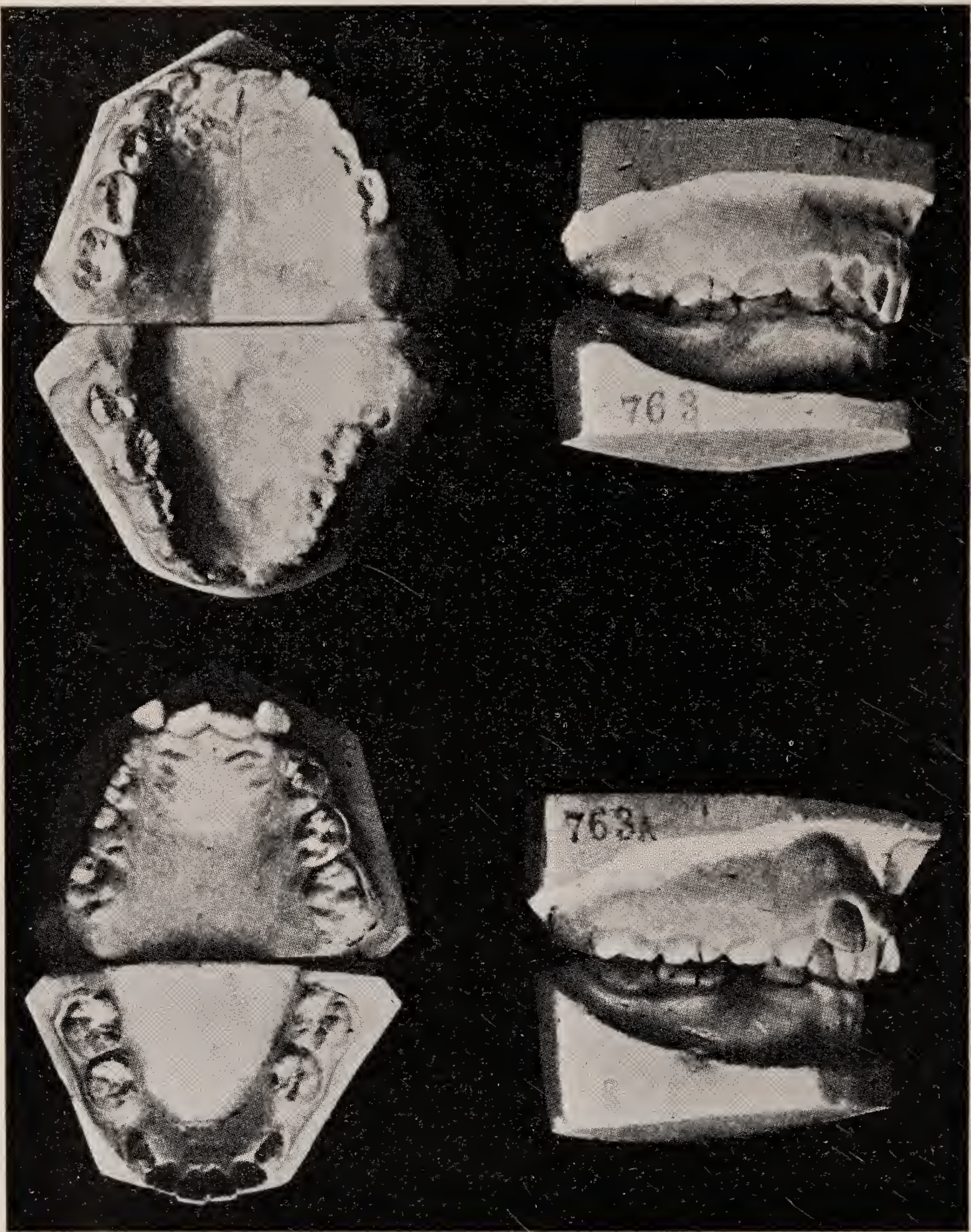


Figure 7

A minor point which had been raised in the discussion of the Report on Normal Occlusion (2) was that the first deciduous molars and the first pre-molars were regarded as one and the same thing for purposes of measuring arch breadth, and he had pointed out that that was not so, and, therefore, measurements based on that assumption were valueless. It was unfortunate that the assumption should have been repeated.

At the time of the publication of the present Report one received the impression that post-normality was due more to an excess of forward

growth of the upper jaw than to a recession of the lower jaw ; the Report does not make such an unqualified statement, but one of the groups investigated " suggests strongly " that it is so, and other groups seem to suggest the same. The proclination of upper permanent incisors, arch length and lateral compression, may have a bearing on this unexpected finding of the investigation. Therefore, it would seem wise to await the result of a further investigation before coming to the conclusion that post-normality is the result of excess of forward growth of the upper jaw.

The Report (p. 90) states that not all the cases of post-normality are due to protrusion of the maxilla, and he could not help feeling that there must be some factor which led either to the drawing of wrong conclusions or was capable of explanation : the Report emphasised that the measurements were extremely difficult to make, that some were almost impossible to make accurately, and that there were other sources of error. Therefore it seemed inevitable that errors would creep in and particularly so when the measurements were made by different investigators. In view of what he had said, it would appear that too much reliance could not be placed on the results of the investigation until they had been confirmed by further work, which should certainly take cognizance of the points he had raised. He ventured to suggest that the investigation should be repeated, but limited in its scope : that only cases with : (i) lower arches normal in size (teeth in good alignment and without imbrication) ; (ii) vertical upper centrals ; (iii) all deciduous molars present (or all premolars present and the spaces resulting from the smaller size of these in relation to the deciduous molars closed) ; (iv) if measurements are made by more than one person, the results of each person making the measurements be reported on entirely separately.

A great deal of praise was due to any investigator or group of investigators who could produce such a mass of statistics and make the deductions therefrom, though it would seem that the value of the statistical work, were it never so well done, could not have the value it deserves on account of those factors in the investigation which have been discussed.

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Mrs. LINDSAY said she had been interested in the investigation from its inception. She had read a paper before the Society, in which she suggested that cases of discrepancy in occlusion between the upper and lower jaws might be due to heredity from two different types, the brachycephalics and the dolichocephalics. A case of post-normal occlusion might have inherited a maxilla from a dolichocephalic and a mandible from a brachycephalic, and they might both be normal to their type. She would like to ask Miss Smyth whether any of the cases had been followed up to later life. She had once examined a skull which Sir Arthur Keith said was that of a young man of twenty years of age ; he had evidently suffered from some respiratory trouble. He must have begun as a case of post-normal occlusion, but, owing to his difficulty in breathing, he had brought forward his lower jaw until it was in normal occlusion. The arches were quite good. The angle of the mandible had been absorbed, as had also the glenoid cavity and the condyle, in an effort to bring the lower jaw forward. With regard to the point that Miss Smyth had made about the depth of the alveolar bone in the molar region, there was very

little growth of bone in the molar region. The angle of the jaw was almost senile. She wondered whether Miss Smyth in any of her cases had found respiratory trouble which might correct the occlusion later on.

She wished to thank Miss Smyth very much; the paper was a difficult one to read, and Miss Smyth had read it exceedingly well.

Mr. O. N. CATCHPOLE said he understood Miss Smyth to say that the arch in the Class II cases was shorter, and later on she said it was also narrower. He would be glad if she would elaborate that point a little. Were the teeth smaller? He thought at first that probably the arch was flatter, and hence its shortness, but then Miss Smyth said it was narrower, so that that could not be the case. He would like to know whether, in the cases in which Miss Smyth found that the front teeth were further forward and the maxilla was forward beyond the normal, she noticed any particular spaces between the six front teeth. Occasionally one saw such cases, and in treating them corrected the molar occlusion, but one still found that there was a big overlap and that there were gaps between the centrals and the laterals, the laterals and the canines, and sometimes the canines and the premolars.

Mr. ROBERT CUTLER said that when a paper of such an abstruse nature was read the general practitioner usually took mental cover until the "all clear" signal was heard. He thought Miss Smyth's paper was very good indeed, and Dr. Young's dignified postscript was, he considered, one of the finest bursts of machine-gun fire, in reply to an attack by the "practical men," that it would be possible to imagine. It was most important that Miss Smyth and her co-workers should not be discouraged, because the practical knowledge of dentistry which they brought to bear on the question of statistics was of the utmost importance. As he had remarked in the discussion on Mr. Wilson Charles' paper at the last meeting, there was unfortunately a very wide gap between the purely practical man, like himself, and the purely scientific man, who had a knowledge of statistics and adjustments and compensations, but who had no knowledge of dentistry. Miss Smyth, like Mr. Wilson Charles, stood in an intermediate group, having a knowledge of practical dentistry and at the same time a scientific knowledge which was very useful in adjusting and reviewing statistics. He thought the discouraging feature at the moment was that the actual criteria which were used as the basis of classification varied with each investigator. Mr. Chapman disagreed with the original premises of the paper rather than with the actual statistics themselves. Until everyone concerned was of the same mind as to the basis of classification, he was afraid that such statistics as might be collected would not be of as much value as they might be, but he thought that any set of statistics was of value if the premises or the bases of classification were fully explained. The expert worker could then see what the basis of classification was of the particular investigator concerned, and he could evaluate any statistics that might be given. If one read the *Transactions* of the Society from its inception one found that an extraordinary change had come over the scene. Twenty or twenty-five years ago the most sweeping assertions were made by clinicians, such as "that cases of post-normal occlusion were above the average in intelligence"; that was just a clinician's statement which might or might not be correct. Nowadays clinicians did not make such sweeping statements; they were not so sure of themselves, and he thought that was a good thing. The opposite extreme had now been reached, the scientific people being rather in control, and he thought that within limits they should be encouraged. He

thought the results would be satisfactory if the investigators could come to terms as to the basis of classification. He understood Miss Smyth to say that those boys who had post-normal occlusion were above the average in height. A paper had been read a number of years ago on post-normal occlusion in which its association with postural defects was stressed, and it was said that one of the methods of treatment of such cases should be muscular exercises to make the patients stand up straight. In some of his own cases in which he had used inter-maxillary traction rubber bands he had often also wanted to pull the child's shoulders back and make him wear an appliance to keep his shoulders back, if only to make the chin stick out more !

He would like to ask Miss Smyth whether the measurements of the post-normal boys were taken with the boys standing straight up or standing in their normal position. If a boy with a postural defect was made to stand straight up against a flat wall he would probably be several inches taller than in his normal position. Miss Smyth had said that in the case of over-tall boys with post-normal occlusion a large part of the defect was, *in the upper jaw* and not in the lower jaw, and that again was a confusing sidelight on the point. He thought that if Miss Smyth's basis of classification was fully and completely stated, any scientific investigator could study such statistics as she might put forward in the light of her original stipulations as to her classification, and learn valuable lessons therefrom. He himself had brought a classification before the Society some years ago, though not on scientific lines. He knew enough about the matter, however, to realise that, if an investigator had clearly in his mind the basis of his classification and set that out fully, any statistics that he might collect when they were fully adjusted and compensated as were Miss Smyth's might be of very considerable value.

Miss K. C. SMYTH, in replying to the discussion, said she was glad to have an opportunity of explaining one or two points which she had hesitated to introduce into the paper, because, as she had not been in a position to elaborate the paper as she had meant to do, she wished to read it as Dr. Young wrote it. The work with which the paper dealt had been started in 1925. She had then been qualified for about eighteen months and was asked to undertake the investigation. She had to take her orders entirely from the Committee and carry out the work assigned to her, her only responsibility being to do the work she was told to do as accurately as possible. She had the advantage of Mr. Champion's and Sir Norman Bennett's personal tuition and, later on, advice from Dr. Friel and other well-known investigators, but the basis of the investigation was decided before she was called into it and she had not had any voice in that matter at all. As time went on, all kinds of things cropped up which she thought required attention ; she brought them before the Committee and in some cases adjustments were made, but in most cases it was quite impossible to make adjustments, because, as Mr. Cutler had said, in work of such magnitude one had to start with certain premises and one could not alter the basis of working or the standards in the middle of amassing the statistics. If it was found that certain errors had been made in the beginning, they had to be acknowledged in the final result, as had been done in the present case. Certain things had had to be discarded and certain things qualified as time went on. She wished to thank Dr. Friel for sending a contribution to the discussion and Miss Clinch for reading it. She fully appreciated the importance of the Frankfort Plane. She had been taught to use it by Dr. Friel and had used it for her own cases, but that was long after the investigation was started, and the

Frankfort Plane was not known to the Committee, or, at any rate, was not considered by them. It was quite impossible to start using it halfway through the investigation, but if she ever started such work again she would undoubtedly use the Frankfort Planes as the basis for classifying cases and estimating the inclination of the incisors. In dealing with the results of the investigation an attempt was made to classify the models. Models had not been taken of all the cases, but in the middle of the investigation she asked whether she might take models, because she foresaw that she would be very much handicapped in dealing with the cases afterwards if she had not got models of them. It was impossible for her to remember the cases in detail, as she measured 1,200 children. She was not instructed to notice the posture of the children, to which Mr. Cutler had referred, or respiratory troubles, to which Mrs. Lindsay had referred, and therefore there were no records of them. But she felt that models would give some information and that to have models of half the cases would be better than having no models at all. It was the cases of which she took models that she tried to classify by Angle's classification with regard to the inclination of the incisors. She then found that the cases could not be divided simply into two groups, as Angle had advocated, so she had made an intermediate group and divided the case in what seemed to her the best way possible, having regard to the material available. She realised the shortcomings in that connection and would rectify them in any further work.

Mr. Chapman had raised the question of the measurement of the lower incisors to the lower border of the mandible giving the height of the mandible in front. That was one of the measurements that it was possible to take very accurately, and she could vouch for it that there would not be an error of more than $\frac{1}{2}$ mm. She wondered whether the whole mandible itself was not small in size, whereas the alveolar portion of the incisors was placed high up and the incisors were bunched together and rose high up, whilst the bone part of the mandible itself was deficient in growth, making the measurement small. She was very interested in Mr. Chapman's point about the greater height of the post-normal cases possibly being due to a general compression, associated with the general narrowing of the arches in the post-normal cases. She thought that was a very important and interesting suggestion. Mr. Chapman had also mentioned the fault of taking the lower premolars and the lower deciduous molars as comparable. She thought they ought to be taken separately, but, of course, at the ages under review, there were very few cases with the deciduous teeth in place.

With regard to Mrs. Lindsay's question as to following up the cases, no instructions about that were given at the beginning of the investigation, but half-way through she asked whether she might start to re-measure certain cases and she was given permission to spend a small amount of time on that. The results could be investigated at any time, but the group was not a very large one and Dr. Young would not undertake any investigation unless a very large number of cases were taken into account. She thought the explanation of the point raised by Mr. Catchpole as to the lower arch being both shorter and narrower was that in the narrow lower arches there was a kind of bending inwards at the side of the arch. The arch, instead of being a real arch, was saddle-shaped, and there was a leaning inwards of the lower premolars and a crowding up of the lower incisors. There was often also a leaning backwards of the lower incisors. With regard to spaces occurring in the maxilla between the incisors in the cases of proclination, she had found that those cases very often showed

spaces between the teeth. In reply to Mr. Pringle's question, Miss Smyth preferred to talk that point over with him personally.

Mr. Cutler had raised the question of the application of scientific investigation to practical problems, and that was the point that Dr. Young wished to bring out in his postscript. She felt herself that when one undertook work of the kind in question it often seemed a desert of dull facts and very little seemed to emerge. She would like to emphasise the fact, however, that when the investigation was undertaken there was no preconceived idea as to what would be found. The investigators did not set out to prove anything or to disprove anything; they set out to discover what would emerge and very little of a positive nature had emerged except the one fact which Dr. Young and she had stressed about the relative forward position of the upper jaw rather than the retrusion of the lower jaw. Mr. Cutler had rather rebuked her for not explaining in more detail the classification that was adopted and the methods that were used in classification and the selection of material. That was all fully explained in the Report and she thought it should have been included in the paper, but she had hesitated to make the paper longer than it already was. With regard to postural defects, unless the child was positively deformed and could not stand up straight the height was taken against a flat wall and the child was made to stand up against the wall, with the feet together and the heels touching the wall, in the normal way.

The PRESIDENT said that the meeting had been a very entertaining one as well as most valuable from the scientific point of view. It was obviously impossible to realise the full significance of the paper when hearing it read, and he was sure the members would be very glad to have an opportunity of studying it when it appeared in print.

On the motion of the President, a hearty vote of thanks was accorded to Miss Clinch for her communication, to Dr. Young and Miss Smyth for their paper, and to all those who had taken part in the discussions thereon, and the meeting then terminated.

Serial Models of Two Cases of Normal Occlusion Between Birth and Four Years

By LILAH CLINCH, L.D.S., R.C.S.I.

THE first nine illustrations in this communication will, at first sight, appear to have no connection with serial models of normal occlusion between birth and four years. Actually they do, I think, give an indication of how this normal occlusion develops; and they explain why I call my second series of models "normal occlusion."

If it is borne in mind that from a very early stage of foetal development the relationship between the jaws has been changing, it can readily be understood that even a slight disproportion in the rate of growth of mandible or maxilla may present an appearance at birth which seems to be abnormal; but this condition will correct itself as the disproportion in growth is readjusted, provided the environment is favourable and no obstruction is present. The distinction between a delay in growth and an abnormality in growth is essential. And in order to recognise a disproportion in growth, it is necessary to have some knowledge of the variations in the relation of the upper and lower jaws to each other at different stages in the foetus. A. H. Schultz, who has done so much work on foetal growth, has diagrammatically represented the range of these variations up to fourteen weeks of age. He shows a projection of the lower jaw which gradually decreases and is succeeded at fourteen weeks by projection of the upper jaw.

The first nine illustrations are made from specimens in the Royal College of Surgeons Museum. They give an indication of the stages of development of the foetal jaws, particularly in relationship to one another.

Fig. 1. A foetus of 56 days. The maxilla and mandible can be clearly seen, and the mandible is considerably longer than the maxilla.

Fig. 2. A foetus of 58 days. The condition is similar to the previous one.

Fig. 3. A foetus of 64 days. Here the development has progressed considerably, and the jaws are becoming more uniform in size, although there is still a slight projection of the mandible.

Fig. 4. A foetus of 74 days. Development has progressed still further and the projection of the mandible has almost disappeared.

Fig. 5. Shows a foetus of 83 days in which there is a slight projection of the maxilla.

Fig. 6. A foetus of 100 days. Very similar to the previous specimen with a possible slight increase in the projection of the maxilla.



Fig. 1.—Fœtus of 56 days. Fig. 2.—Fœtus of 58 days.

Fig. 3.—Fœtus of 64 days.



Fig. 4.—Fœtus of 74 days.

Fig. 5.—Fœtus of 83 days.

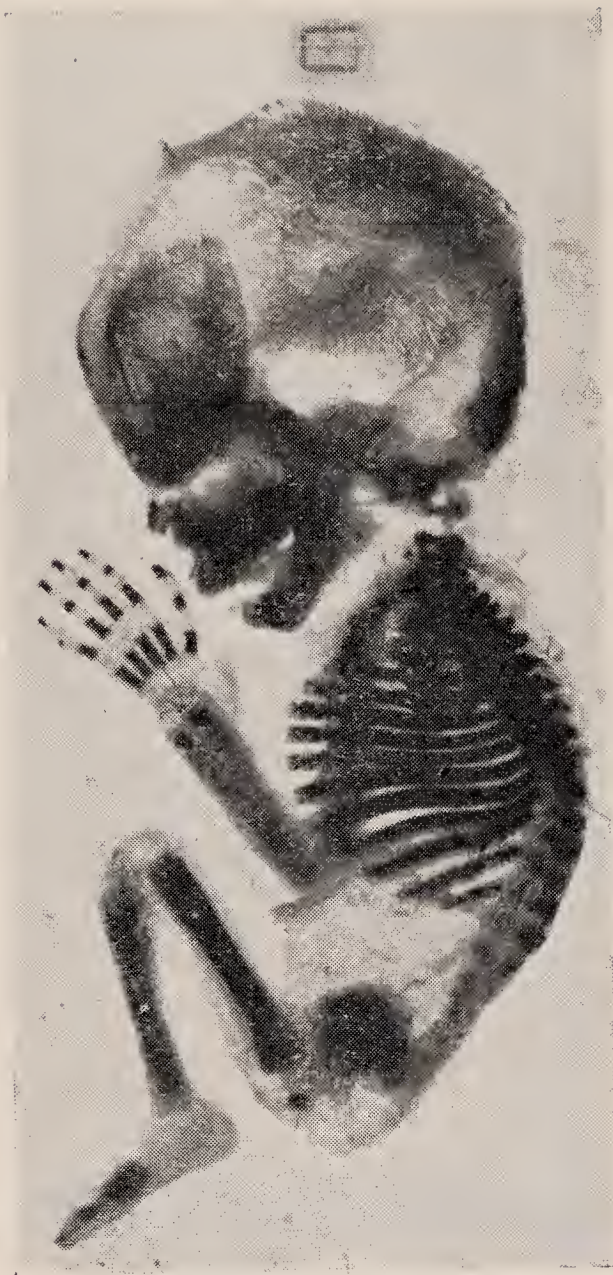


Fig. 6.—Fœtus of 100 days.



Fig. 7.—Fœtus of 110½ days.

Fig. 7. A fœtus of 110 days. Here again the projection of the maxilla has increased.

Fig. 8. A fœtus of 5 months—still showing the projection of the maxilla, although the profile (if it can be seen) would indicate a greater difference in relationship than is actually present in the jaws themselves.

Fig. 9. The head of a fœtus of 6 months. The projection of the maxilla is still present, but to a lesser degree than in the previous specimen.

This, then, gives a brief outline of the stages of jaw development up to 6 months ; the evidence at present is entirely inconclusive, but it seems to me that a projection of the mandible is succeeded by a projection of the maxilla and then a further growth forward of the mandible, giving at birth a condition in which the lower gum pad is very slightly lingual to the upper (Fig. 10a). This is followed at 4 years of age by the occlusion shown in the lower diagram (Fig. 10b). The intervening stages are shown in Figs. 11, 12 and 13.

Fig. 11. The upper models (1D) were taken at 1 year 6 months. They show a partial eruption of the first deciduous molars and a close-bite of the lower incisors.



Fig. 8.—Fœtus of 5 months

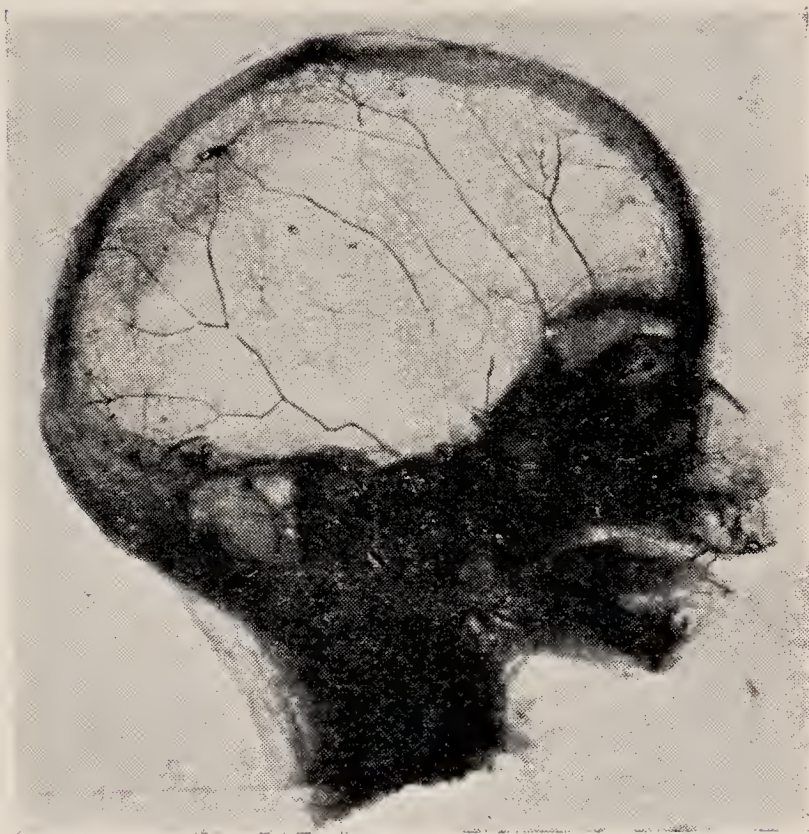


Fig. 9.—Head of fœtus of 6 months.



Fig. 10a.—Case I. Drawing of gum pads in occlusion ; lower arch slightly lingual to upper arch in incisor and molar regions. Vertical space in incisor region.

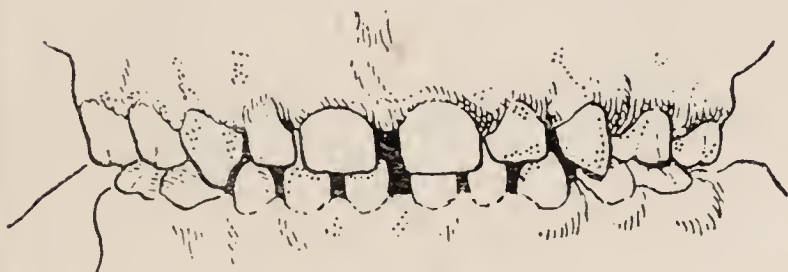


Fig. 10b.—Case I. Age 4 years. Drawings of teeth showing normal occlusion.

The second models (1F) were taken at 2 years 9 months. They show the incisors, canines and first deciduous molars in position. There is still a close-bite in the incisor region, but it has opened very slightly.

The third models (1J) were taken at 4 years. All the deciduous teeth are in position and the bite has opened very considerably. Except for a slight shifting of the centre, this could almost be called ideal occlusion.

Fig. 12 shows the left side of three pairs of models from the same series as those on the previous slide.

The upper models were taken at 2 years 9 months (1F).

The next, at 3 years (1G) and the third at 4 years (1J). The occlusion of the first deciduous molars is changing at each stage. The distal surfaces of the first deciduous molars in the upper models are flush and the upper canine occludes anterior to the space between the lower canine and the lower first deciduous molar. Six months later the upper canine is occluding in the space, the lower first deciduous molar has come forward, and at 4 years of age the second deciduous molars are in occlusion.

Fig. 13 shows occlusal views of the same case taken at 2 years 9 months and at 4 years. There is no increase in arch breadth between the first deciduous molars, nor is there any alteration in arch length measuring from the distal surface of the first deciduous molars, to the mesial surface of the central incisors. As a matter of fact, the lower model of the first pair occludes perfectly with the upper model of the second.

The next case shows a delay in growth of the mandible at birth.

Fig. 14a. The lower gum pad is well behind the upper, but there is a vertical space in the incisor region. At 3 years 6 months there is normal occlusion of the deciduous teeth. (Fig. 14b.)

The intervening stages are shown in the next illustrations. (Figs. 15, 16 and 17.)

Fig. 15. These models were taken at 2 years (3D), 2 years 10 months (3E) and 3 years 6 months (3F), respectively. At 2 years, with the incisors, canines and first deciduous molars in occlusion, there is a close-bite in the incisor region. This has decreased considerably at 2 years 10 months with the partial eruption of the second deciduous molars, and at 3 years 6 months with the full eruption of the second deciduous molars there is a normal over-bite.

Fig. 16 shows the left sides of the same models. At 2 years the distal position of the mandible at birth has disappeared, and there is a normal occlusion for that stage. The distal surfaces of the first deciduous molars are flush. At 2 years 10 months the lower teeth have moved forward, and at 3 years 6 months there is a normal occlusion. Had there been no vertical space between the gum pads at birth the distal position of the mandible could not have cured itself, as the overlapping anterior margin of the upper gum pad would have acted as an obstruction to the further forward growth of the mandible. It is probable that a habit such as thumb-sucking would have also prevented this forward growth.

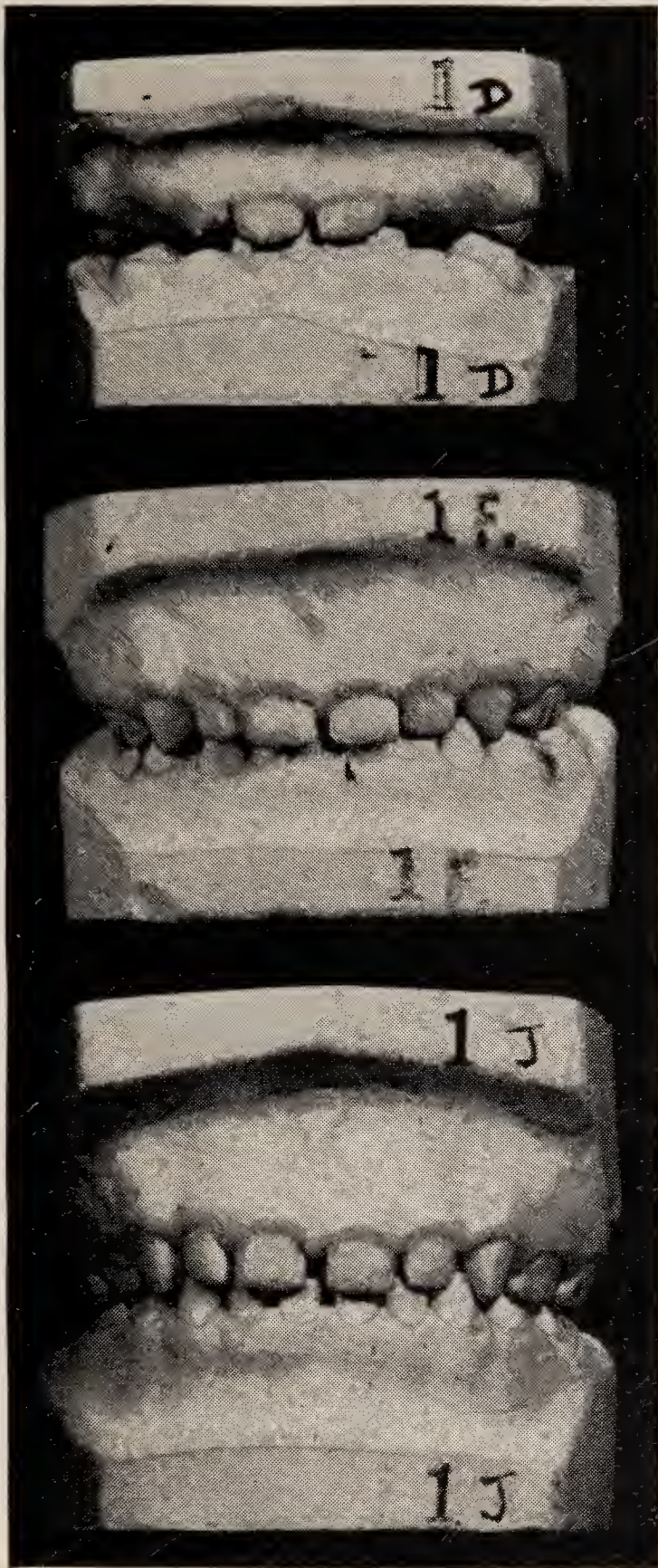


Fig. 11. Case I. 1D—1 year 6 months.
1F—2 years 9 months.
1J—4 years.



Fig. 12. Case I. 1F—2 years 9 months.
1G—3 years.
1J—4 years

Fig. 17 shows the occlusal views of two parts of models of this same case. The first taken at 2 years and the second at 3 years 6 months.

There is an increase of 1 mm. in arch breadth between the first deciduous molars, and also an increase of 1 mm. in arch length measuring from the distal surfaces of the first deciduous molars to the mesial surface of the central incisors.

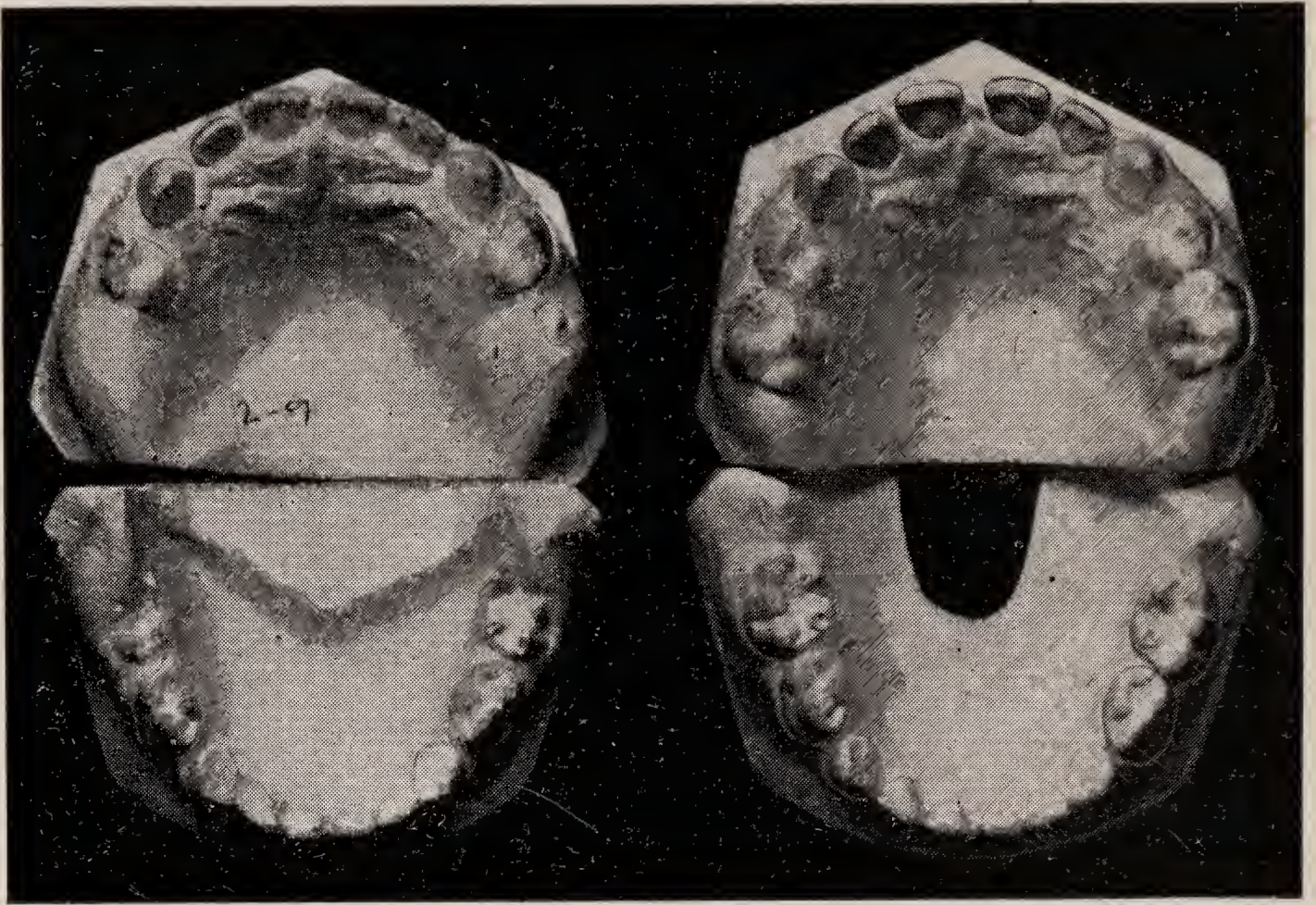


Fig. 13. Case I. Occlusal views at 2 years 9 months and at 4 years.



Fig. 14a. Case 3. Age 21 days. Drawing of gum pads in occlusion. Lower arch slightly lingual and posterior to upper in incisor region and definitely posterior in molar region. Vertical space in incisor region.



Fig. 14b. Case 3. Age 3 years 6 months. Drawings of teeth showing normal occlusion.

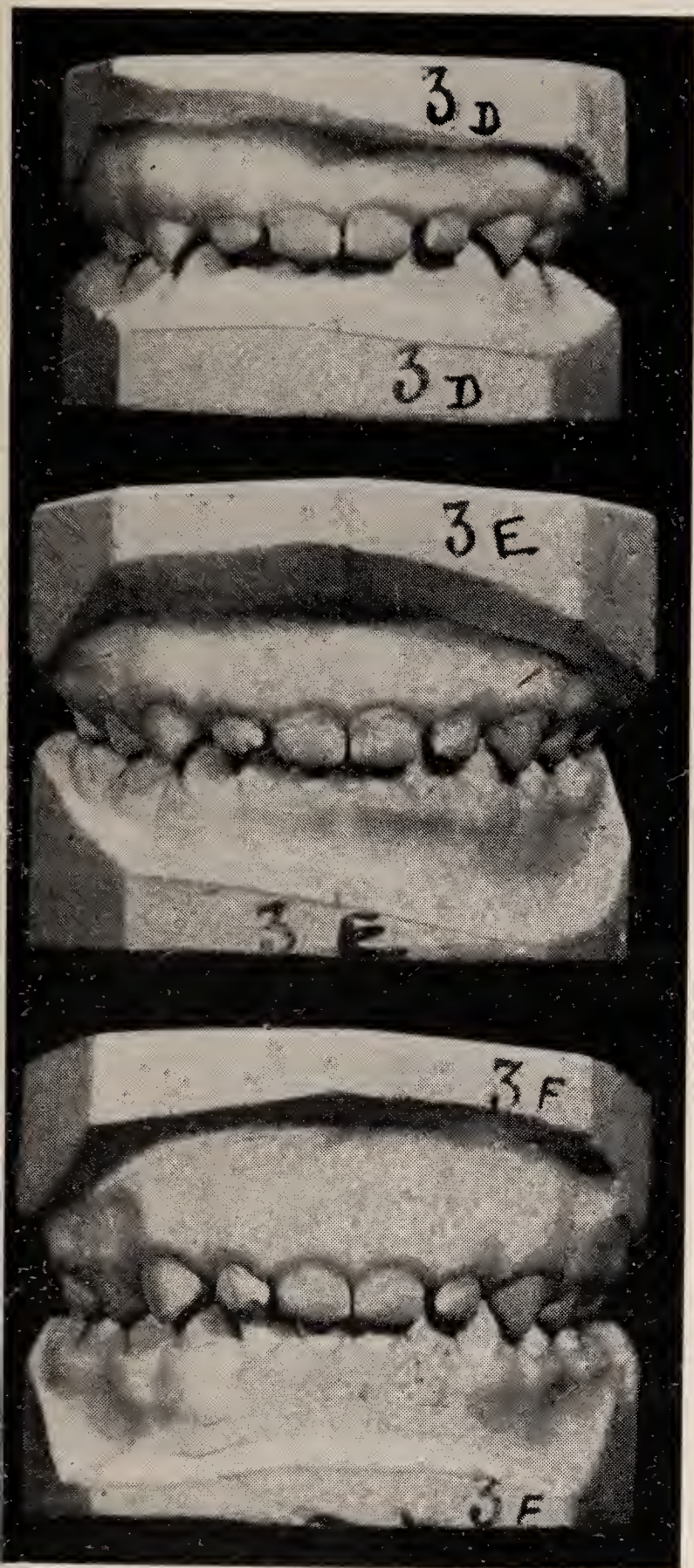


Fig. 15. Case 3. 3D—2 years.
3E—2 years 10 months.
3F—3 years 6 months.

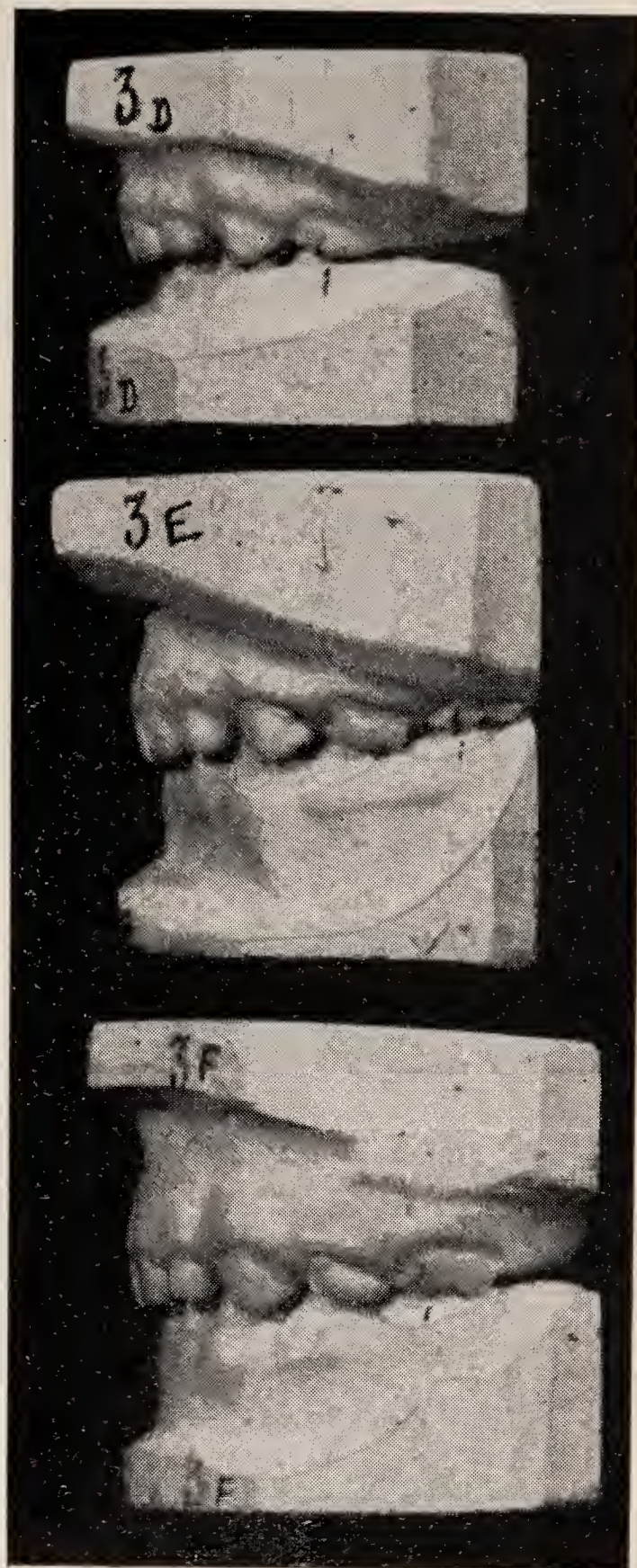


Fig. 16. Case 3. 3D—2 years.
3E—2 years 10 months
3F—3 years 6 months.

I hope these two cases will demonstrate that arch relationship is constantly changing between birth and four years of age, and also in the foetus; that a disproportion of growth at birth will correct itself unless mechanically prevented from doing so. But that an abnormality at birth (such as absence of a vertical space in the incisor region) will not correct itself and will hinder further development.

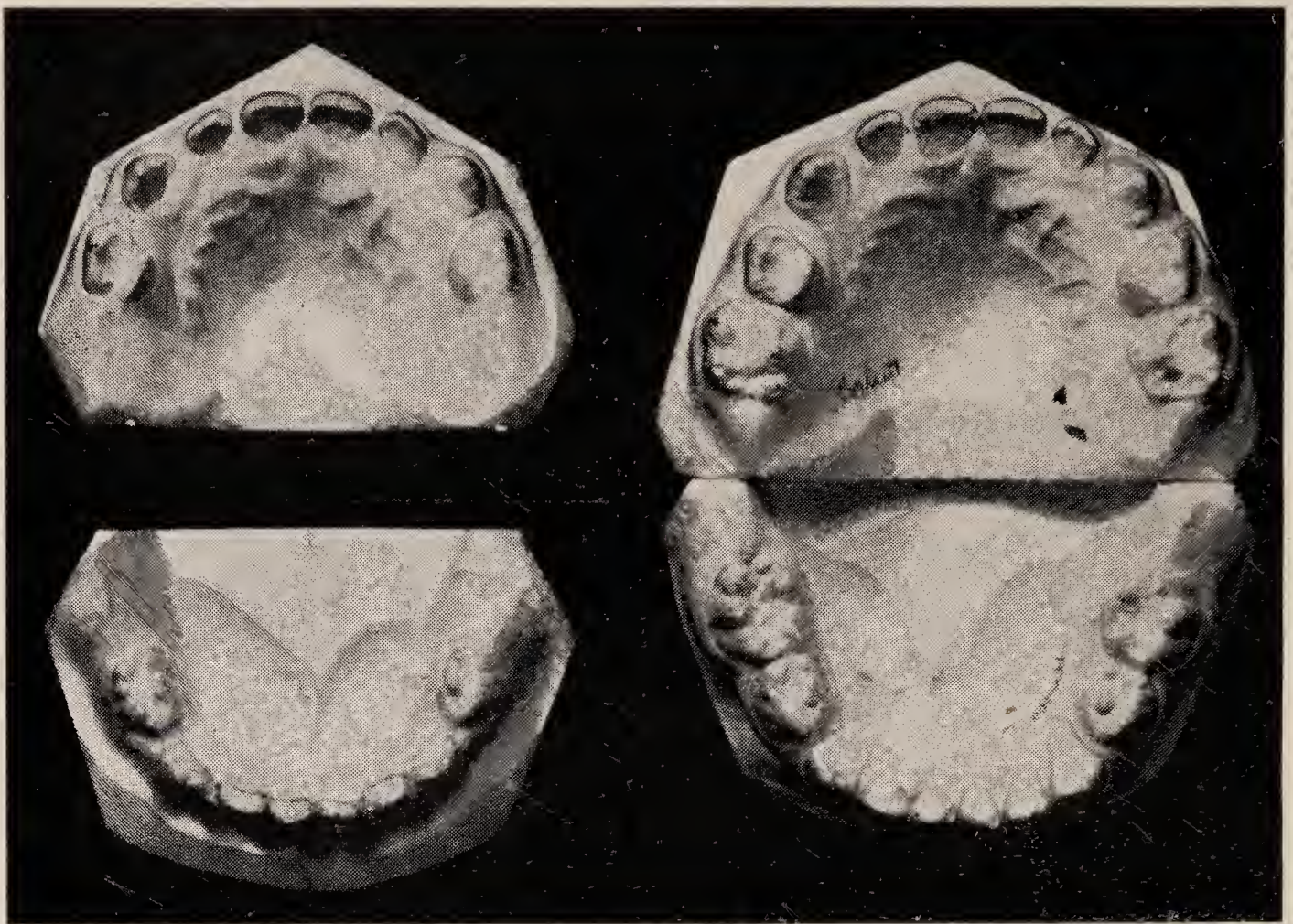


Fig. 17. Case 3. Occlusal views at 2 years and at 3 years 6 months.

I would like to thank Dr. A. J. E. Cave for having given me permission to photograph specimens in the Museum of the Royal College of Surgeons.

Discussion

The PRESIDENT said the members were very much indebted to Miss Clinch for her further communication showing some of the work that she had done. He would like to know whether the models taken a few weeks after birth were of the same children as the models taken at two, three and four years of age.

Miss K. C. SMYTH said she would like to thank Miss Clinch for the work that she was doing which was of very great value. With regard to the development of the space in the incisor region, she understood Miss Clinch to say that if the space was absent at birth it was a permanent bar to further development. She would like to know whether the space ever appeared if it was not there at birth.

Mr. WILSON CHARLES said there was a difficulty in using human foetuses for investigation. A French anatomist had prepared something like 250 or 300 foetal specimens and had shown that a great many of the opinions which had been held about foetal development were not altogether correct, because the specimens from which those opinions had been formed were definitely abnormal, and that could be seen only by comparing them with normal specimens. It was for this reason that he had used pigs for his own investigation. When he had read a paper before the Society in 1934 he had said that he used pigs because he could not get human material, but later, when he could get sufficient human material, he had continued to use pigs, because of the difficulty of knowing whether human foetuses were normal or abnormal.

Mr. HAROLD CHAPMAN said the members had heard from time to

time about the foetal changes, the mandible being too far forward at one moment and the maxilla being further forward at another moment, but he thought the present was the first occasion when it had been demonstrated on the screen that such changes did occur, and Miss Clinch was to be congratulated on having been the first to do so. He had been struck by the fact that in the earlier models there were spaces between all the teeth, which confirmed what he had noticed also, that the spaces between the molars closed. Reverting to the question raised by Miss Smyth, he thought it had been said previously that cases were normal when the gum pads were in contact in front, and he would like to know whether he was under a misapprehension about that. Might the gum pads be in contact in some cases and apart in others when the occlusion was normal?

The PRESIDENT, referring to Mr. Chapman's remarks, said he had been going to ask Miss Clinch whether she had been able to see and follow up a sufficient number of cases with a space between the gum pads in front to say whether all such cases were followed by normal occlusion. Did Miss Clinch think that in some cases the gum pads might be in contact and yet the occlusion prove to be normal?

Miss L. M. CLINCH, in replying to the discussion, said that all the models she had shown were serial models of the same children which had been taken at various stages between birth and four years of age. With regard to the space in the incisor region, so far she had not been able to obtain a really good number of cases and follow them up from birth to four years of age, but she had about forty cases; and, of those cases, six started with a post-normal mandible and had a space in the incisor region at birth. Five of these showed normal occlusion at four years of age. And every case which started with a post-normal mandible and had not a space in the incisor region, remained post-normal and ended up with a close-bite. If the antero-posterior relationship of the upper and lower jaws was normal, but there was no space, there was a close-bite all the way through. The lack of space was a bar to further development. She had never seen a case in which the space developed after birth. The overlapping of one gum pad over the other increased very much when the teeth started to erupt. She had had no opportunity of discovering when the space appeared in the foetus. X-ray photographs appeared to her to be inconclusive on the subject. She did not yet know whether the space was in the bone or simply in the gum, but she hoped to see more specimens and to learn something from them. She quite agreed with Mr. Wilson Charles that the evidence provided by the foetuses was entirely inconclusive. She had simply shown slides of all she could find, and it was certainly an odd coincidence that they were all so similar; there was no great variation in any of them. In reply to Mr. Chapman's question as to whether the space was normal, she thought it was. Unless the space was present at birth she thought the occlusion would not be normal at a later stage.

Demonstrations, 1940

SERIAL MODELS OF TREATED AND UNTREATED CASES

By MURIEL P. MICHAELIS, L.D.S.Eng.

THE demonstration was intended to show the difficulty in selecting those cases which can safely be left without treatment.

Models were shown from practice demonstrating untreated cases. Some showed very successful results and others quite the opposite. Some of these cases would have been treated but for unavoidable circumstances had to be left alone. Others had been left alone on purpose. Treated cases were shown for comparison.

SIMPLE ORTHODONTIC PLATES

By HUBERT C. VISICK, L.D.S.Eng.

UNDER war conditions some orthodontic cases can only attend at very infrequent intervals, and appliances which are reliable and will go on working for long periods are desirable. I have found that vulcanite plates with stainless steel springs are very useful. I am using much lighter wires and increasing their elasticity by including a large loop in the length of the spring, thus increasing the range of movement. Although these longer springs are so delicate they have such elasticity that they do not get permanently distorted by rough handling. Soldered joints should be avoided wherever possible, as they reduce elasticity and are more liable to breakage than an untouched wire.

CHIN CAPS

By HAROLD CHAPMAN, L.D.S.Eng.

A CHIN CAP, made of material, is described in an article, "Tailor-made Chin Retractors," by W. E. Stoft (*A.J.O.*, 1939, 25, 461). The idea appears to be preferable to any other chin cap, so I intend to try it but have recently found what it is hoped will prove to be suitable material. (The material is called Corslet material, and obtained from Messrs. D. H. Evans, Oxford Street, London, W.1.)

Two chin caps were shown, the larger is made from a rectangular piece of Corslet material, $7\frac{3}{4}$ in. by $3\frac{5}{8}$ in., which is oversewn and then bound. The material is now centred on the chin and the excess at the back folded from below upwards on to the cheek; the excess over the upper margin of the main piece is folded back again and the overlapping pieces sewn together. Two hooks, facing forwards, are attached near the extremities at the upper and lower borders. The smaller chin cap is $\frac{1}{4}$ in. narrower.

The demonstration is the result of the article referred to above: no originality is claimed for it.

SHORT COMMUNICATIONS

Delivered before the Society, December 6th, 1941

DISTAL MOVEMENT OF THE CHEEK TEETH and NIGHT-TIME APPLIANCES.

By L. RUSSELL MARSH, L.D.S. (Eng.).

WAR brings changes, or perhaps one should say that War accelerates those changes which were already in process of happening by slow degrees. It will be the same with Orthodontics as with everything else, and I think we should prepare to consider our problem from a different angle—not knowing, at the moment, actually what that angle is going to be. Already, before the War certain changes were happening in the direction of cheapening appliances and making treatment accessible to a larger number of people. On the Continent we saw that Orthodontics was conducted on a wider, and probably less expensive, basis than it is here.

The worrying times we went through in 1937-8 and the beginning of the War itself have served to obscure two developments which are probably among the most important advances in the history of our science. I refer first to the movement distally of the molar and premolar teeth, and, secondly, to the treatment of cases by removable appliances at night time only. I venture to suggest that both of these innovations will prove to be of paramount importance in Orthodontics of the future.

I personally am indebted to Schwartz, of Vienna, for my introduction to both of these ideas on treatment, and indeed I believe that he was the author of the appliance for distal movement of the side teeth, and the conception of the principles of anchorage for this purpose. Whether he originated the idea of treatment at night, I don't know. His appliances were shown by Mr. O'Henry at a demonstration here before the War.

You will readily see that once these ideas are accepted a vast new field of orthodontic possibilities is opened up.

One of our headaches in the past has been the Class II div. 1 Case—the true superior protrusion in which all the maxillary teeth are translated forward. That type of case is very prevalent in this country, and is often further complicated by early removal of the temporary molars and consequent forward displacement of the first permanent molars. Unable to move the maxillary arch of teeth backward, and unwilling to produce a final condition of prognathism—however slight—we have had, in some cases, no alternative but to resort to extractions.

I suggest that none of us has been satisfied with that mode of treatment, and indeed it is not by any means always a practical second class answer to our problem. Schwartz's method, by re-asserting the full effect of the Curve of Spey, and thus correcting the associated close bite, provides a practical as well as an ideal answer to the Class II problem.

But for a minor accident not unassociated with Enemy Action I should have had a couple of cases to show you, with which I believe you would have been pleased, and which illustrated satisfactorily the advantages of the Schwartz method.

Another problem that has probably worried most of us is the question of function. We agree that the object of the Orthodontist should be to restore normal function at the earliest possible moment, and yet during a period of vital growth for two or three years or

more, our appliances make normal function difficult if not well nigh impossible. There is no doubt in my mind that in a number of cases speech training should go hand in hand with our work; but to a greater or less degree speech is impaired by our appliances, and speech training is impracticable. The principle of night treatment provides an answer to this problem.

Just before the War I had a long talk with Schwartz, who does practically all his work by means of removable appliances worn at night. His argument is that you get only a partial relapse during the day, and that the net progress, although slower than that produced by the full time appliance, is more reliable and less subject to relapse. Moreover, the full function of the muscles during daytime helps the treatment, and helps to stabilise the progress made. His arguments were supported by the unquestionable evidence of a number of remarkable cases which he showed me.

Another advantage of night treatment is that types of appliance can be worn which would be impracticable in the daytime.

For instance, the Andresen or Norwegian appliance for inter-maxillary traction, which, when once the principle is understood can be modified to produce all sorts of changes (some of which surprise the Orthodontist as much as the patient). I am indebted to Mr. Endicott and his colleagues at the Eastman Clinic, where they have been using this method for some time, for my instruction in the Norwegian system.

The War with its attendant difficulties of travel has led to many improvisations in our work, and we have been finding that the removable appliance is, on the whole, safer when working at a distance and with visits few and far between. When I have to use fixed appliances I have been in the habit recently of soldering my lingual arch to the molar bands, and I find that this method saves a lot of trouble—no sore tongues; no breakages or disconnection of the arch. For adjustment I crack the bands off the teeth and afterwards re-cement the appliance. This periodical removal also has its advantages.

Perhaps some of our improvised methods will influence our ideas of treatment for the future. If they tend towards simplification they certainly should.

MOVEMENT OF A SECOND LOWER PRE-MOLAR.

By JOHN STURROCK, L.D.S.

FIG. 1 shows the second right lower pre-molar horizontal in the jaw at age 14.4, when it was uncovered by removal of the gum and bone from the crown. There was no other treatment.

At age 15.8 the left lower second pre-molar had erupted, was vertical and in contact with the left lower second permanent molar, as in fig. 2.

The date of the removal of the left lower first permanent molar is not known.

In two other cases unerupted canines in the palate were similarly laid bare. The teeth erupted without the application of force. They were then moved into correct alignment by ordinary orthodontic means.

The PRESIDENT said he had been in the habit of laying it down as an axiom that where an unerupted canine lay deeply in the palate one could expose the crown and wait for years and nothing would happen, but when it lay outside it would come down in a few months. He was pleased to hear that there was a chance for a canine right

up in the palate. In the other case, he asked, was the only treatment the exposure of the crown?

The AUTHOR replied that that was all. The patient did not come back, and he had no opportunity of doing anything else.



Fig. 1. Case No. 3237F. Age 14-4.
(This is the left side, the negative has been reversed.)



Fig. 2. Case No. 3237F. Age 15-8.

MALFORMATION OF THE MANDIBULAR RAMUS TREATED BY BONE-GRAFT.

By MARTIN A. RUSHTON, M.B., L.D.S.
(Emergency Medical Service.)

THIS boy was born with practically no external ear and Sir Harold Gillies has been making him a handsome new one built up around his mother's ear cartilage which was removed and implanted. Associated with this auricular defect was a defect of the mandible. There was no ramus on the left side but only a stump which articulated

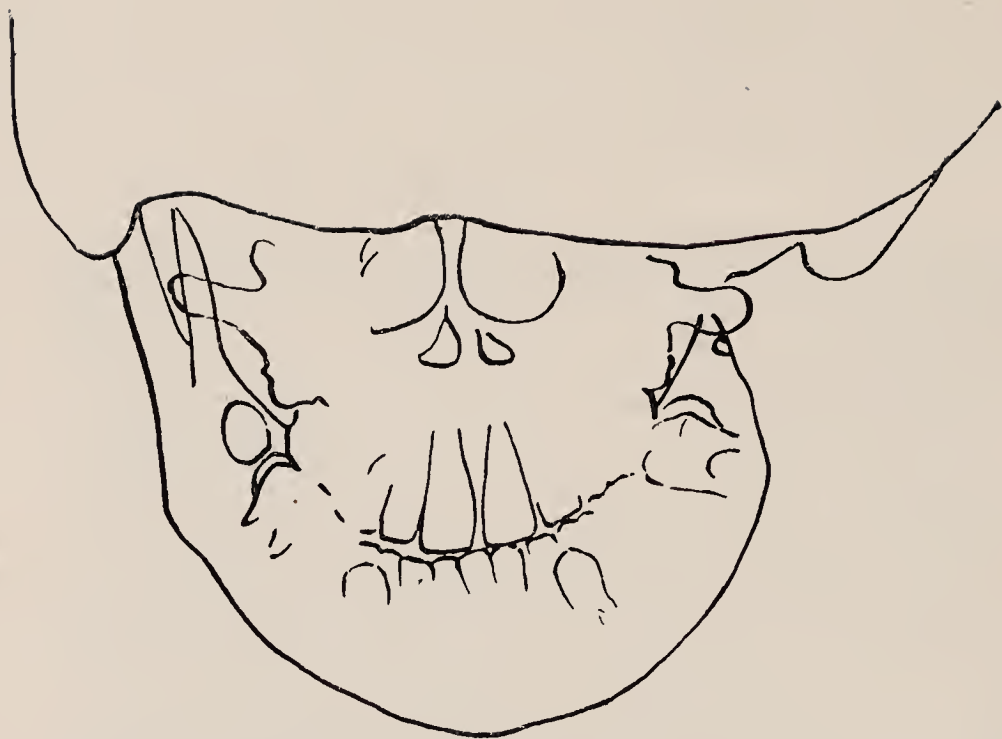


Fig. 1. Tracing of radiograph showing failure of left mandibular ramus.

(as we found at operation) with the base of the skull somewhere medial and anterior to the mastoid process (fig. 1). Owing chiefly to the tilting of the mandible the left side of the face appeared short in a vertical direction, and in an attempt to remedy this Dr. J. Converse of the American Hospital in Britain decided to divide the mandible posterior to the left second molar tooth and to insert a piece of bone between the body of the mandible and the primitive joint. This led us to study the occlusion. We found that on the side of the defect the bite was very close, the first molars being only half erupted, whereas on the right these teeth were of normal height (fig. 2). It

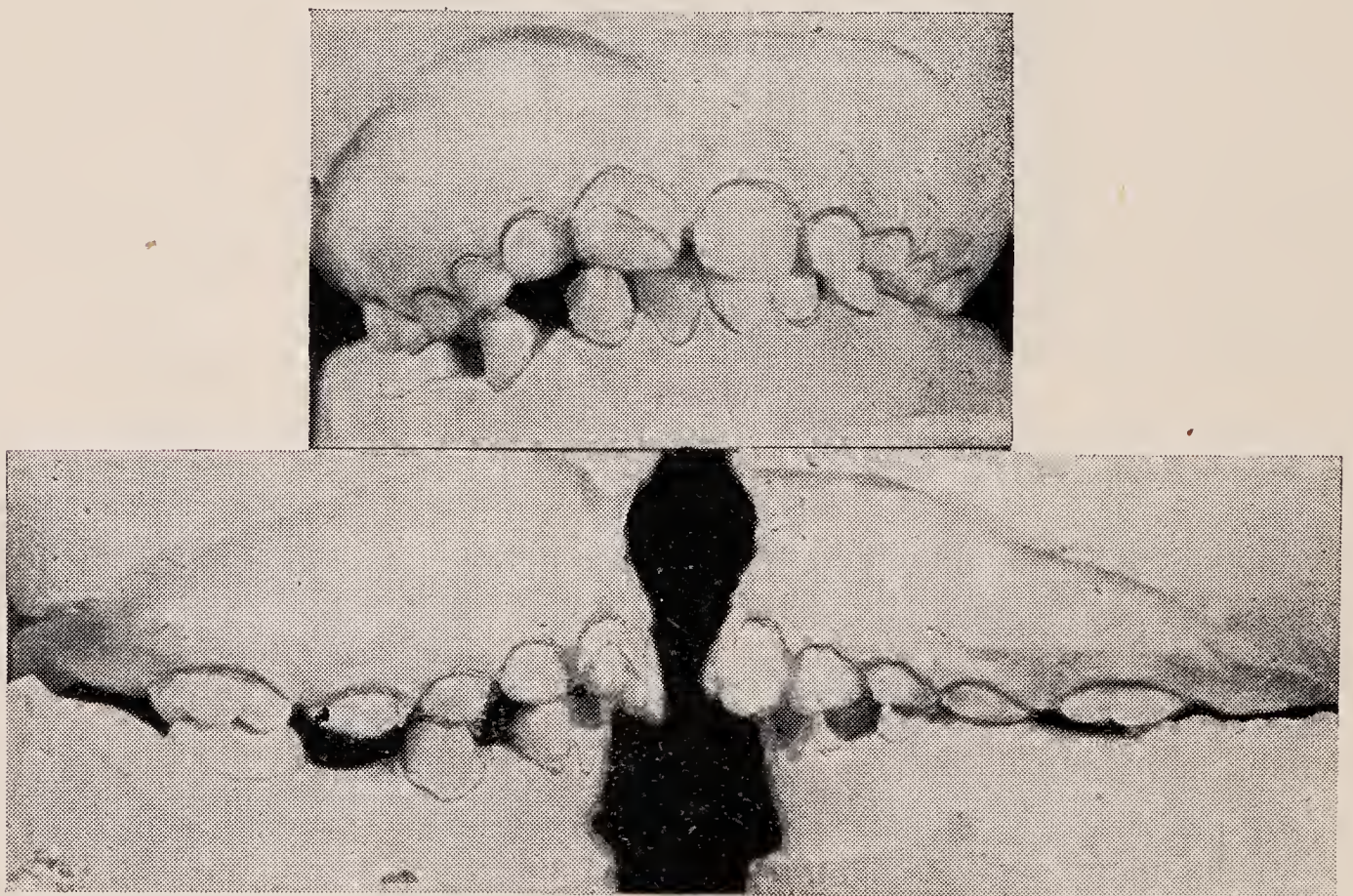


Fig. 2. Occlusion of teeth before operation.

was proposed to open the bite on the left, and cap-splints were made to maintain the new position, a pad of gutta-percha being inserted between the left cheek teeth. The operation was performed and fig. 3 shows the condition at that time. The splints were worn for



Fig. 3. Tracing of radiograph showing condition of left side after operation with gutta-percha pad separating teeth, and bone-graft (BG) in position.

six weeks, and on removal there was an open bite of six mm. in the left molar region. A year later the molar teeth were again in occlusion, partly owing to eruption of the teeth and partly to remoulding of the "ramus" (figs. 4 and 5). The bone-graft had become completely



Fig. 4. Tracing of radiograph showing condition one year later.

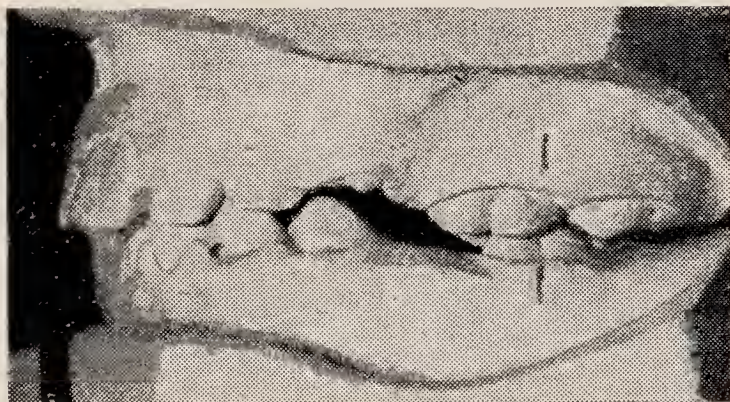


Fig. 5. Occlusion of teeth on left side one year after operation.

consolidated and its outline could no longer be recognised. The appearance of the face from the front was considerably more symmetrical and mastication was very efficient. It is interesting to note that division of the mandible immediately behind the second molar has not interrupted the development of its roots.

SYMMETRICALLY PLACED SUPERNUMERARY MANDIBULAR PRE-MOLARS.

By GEORGE NORTHCROFT, O.B.E., L.D.S., R.C.S. (Eng.)

THIS case was thought, at one time, to be quite unique, that of symmetrically placed supernumerary mandibular premolars erupting lingually at the age of twenty-three.

The patient, a male, has been under observation from time to time for 20 years. The first models were taken at the age of 4.5, and show post-normal occlusion with marked overbite. This condition was corrected by the age of 9.9.

After going to boarding-school, an exposure developed in 6 which was removed, but 7 came into very good occlusion, which remained

stable to that side. On the right side, the occlusion, although quite functional, has reverted to post-normal, and the incisors, although not unsightly, have become imbricated. The $\overline{8} | \overline{8}$ were deeply impacted, and $\overline{7} | \overline{7}$ were removed because of the probable damage already occurring at the posterior roots of these teeth.

On September 19th, 1941, the patient presented with a supernumerary erupting in the left mandible lingually between the premolars. The supernumerary was removed, and a similar tooth was seen on the opposite side about to erupt. Since that date, Mr. C. F. Ballard has drawn my attention to a similar case, and kindly allowed me to demonstrate it. It occurs in a student at the Royal Dental Hospital, where $\overline{4} | \overline{4}$ seem to be erupting on the labial and two supernumerary teeth on the lingual side. In this case, the maxillary arch is crushed in on the left side, and the mandible has swung over half a tooth to the right.

Mrs. Michaelis asked whether there was an early X-ray record of the very interesting cases upon which Dr. Northcroft had reported. It would be interesting to see how soon those supernumerary teeth appeared on the X-ray photographs, if any were taken.

Dr. NORTHCROFT said he had not taken any X-rays for some eight years previously, so that he did not know when the supernumeraries first appeared. They were not shown on the X-rays taken eight years ago, or at least he did not notice them; but they must have been somewhere there, of course.

The PRESIDENT: It is a comparatively rare condition, is not it?

Dr. NORTHCROFT said it was very rare; he had thought the case was unique until he was shown another. There was not one in the odontological museum.

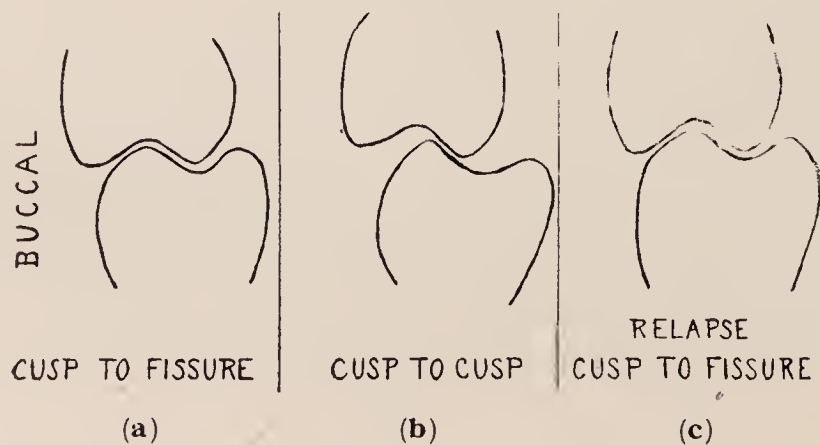
OPENING THE BITE.

By KENNETH E. PRINGLE, L.D.S. (Eng.).

WITH regard to the use of the upper anterior bite plate, two questions among others come to one's mind:

1. What happens to the cheek teeth, when using this type of plate?
2. Why does a bite opened by this method so often relapse?

To answer the first question by saying that "the tooth changes are probably a rising of the cheek-teeth in their sockets" (Bennett, Chapter X.) is hardly sufficient. To my mind the essential part of this process is that the upper cheek-teeth usually, usually but not always, erupt, wheel, swing or tilt downwards and outwards while the lowers go upwards and inwards. Thus, instead of finding the palatal cusps of the upper cheek-teeth articulating with the antero-posterior fissures of the lower teeth (figure a), one finds the buccal side of the upper palatal cusps articulating with the lingual side of the buccal cusps of the lower teeth (figure b). The bite is thus gagged open by a cusp to cusp rather than a cusp to fissure relationship



This explains why, when we are able to get a bite-plate without clasps or bows to stay up, the bite opens so quickly, for there is nothing to prevent the upper cheek-teeth from wheeling outwards and the cusp to cusp relationship is thus readily established. Every clasp or bow fitted to the cheek-teeth limits the movement of these teeth.

Of course, where an upper expansion screw plate is used, the cusp to cusp relationship is produced mechanically and the bite is rapidly propped open.

For the bite to be propped open as described it is not necessary for all the cheek-teeth to come into cusp to cusp relationship. One pair of back teeth on each side occluding in this way can gag the bite open considerably in the incisor region.

With regard to the question of relapse after the bite has been opened by means of a bite plate, it seems to be assumed that the cheek-teeth are pushed back into their sockets. This may be so, but a far simpler explanation is that the inclined planes of the upper palatal cusps and the lower buccal cusps under the stress of mastication work on each other so that the original cusp to fissure relationship is re-established and the bite becomes "close" again (figure c). It may be noted that in cases where the bite has been gagged very widely open and a tip of cusp to tip of cusp relationship has been established, there is much less tendency to relapse although the stresses exerted by mastication must necessarily be much greater.

For the sake of brevity no mention has been made of the important movements of the incisors, nor of forward movement of the mandible nor of the larger question of whether bite plates are of any use at all.

Models were shown to illustrate the points made.

SECONDARY RETENTION OF DECIDUOUS MOLARS

By C. F. BALLARD, L.D.S., M.R.C.S.Eng.

In this communication, I wish to show some models which I believe to be early examples of the condition called secondary retention of deciduous molars, as described by Drs. Dorian and Izard—*L'Orthodontie Francaise*—1929. They divided the condition into primary and secondary retention. The former is supposed to be due to arrest of the development of the deciduous tooth germ at a very early stage or to some obstacle which prevents its eruption. I have never seen a case and it does not concern me in this paper.

Secondary retention they describe as following this mechanism :—

(a) The tooth has never completely erupted and is impacted against the bulbous surface of the approximal teeth ; or

(b) It erupted to the level of the approximal tooth but was left behind during vertical development.

Later the tooth in this infra position may stage a fairly rapid disappearance into the tissues because, as is said by Drs. Dorian and Izard, there is pressure from the approximal teeth, this pressure being most likely to occur when the second permanent molar erupts.

The photographs show the condition on one side only in each case, although it is bilateral in all of them. The condition of infra clusion occurs in both upper and lower jaws in the same patient, and in brother and sister in the case of the first two (Figs. 1 and 2). I have also a record of the condition occurring in two sisters (not twins). This may indicate that it is due to some inherited abnormality. They also show infra position and infra clusion of both first and second deciduous molars. I have not seen any literature describing this.

There is no doubt in my mind that these teeth were fully erupted and in occlusion at one time ; this, together with the fact that both deciduous molars are involved rules out impaction as a possible cause.

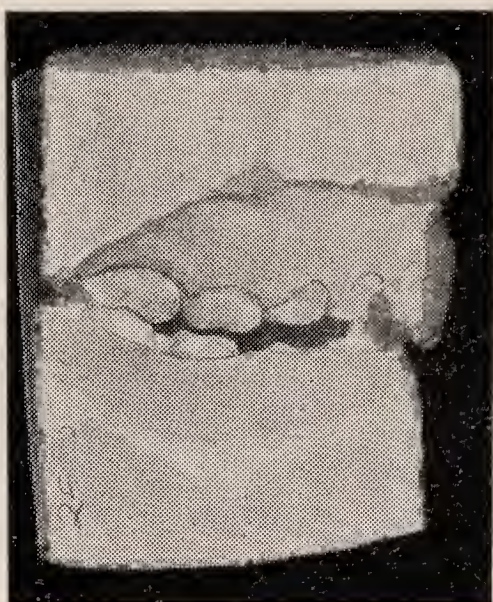


Fig. 1.

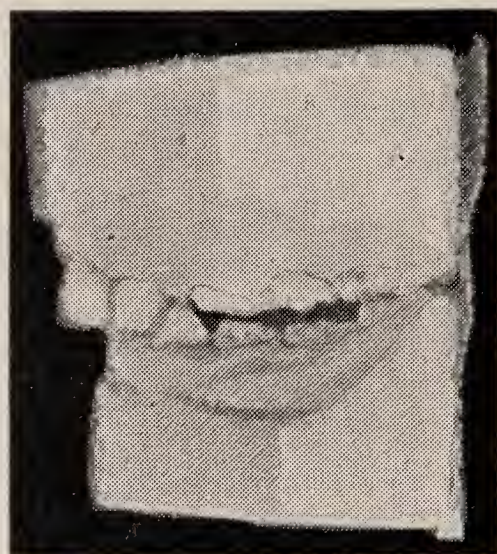


Fig. 2.

1st Case.—S.K. Age 11 yrs. 11 mths. $\frac{6EDC21}{6E\ 4321} \mid \frac{12DE6}{123DE6}$ present. About $\frac{1}{2}$ unit post-normal with close-bite. Infraclusion of $\frac{E}{DE}$ with slight elongation of $\frac{D}{DE}$. X-rays show $\frac{54}{54} \mid \frac{45}{45}$ present.

2nd Case.—C.N.K. Age 9 yrs. 8 mths. $\frac{6EDC21}{6E4321} \mid \frac{12\ DE6}{123DE6}$ present. 1 unit post-normal. $\frac{E}{E}$ carious, allowing slight mesial drift of $\frac{6}{6}$. Infraclusion of $\frac{E}{DE}$. Elongation of $\frac{E}{E}$, but tooth dead due to caries. X-ray, $\frac{54}{54} \mid \frac{45}{45}$ present.

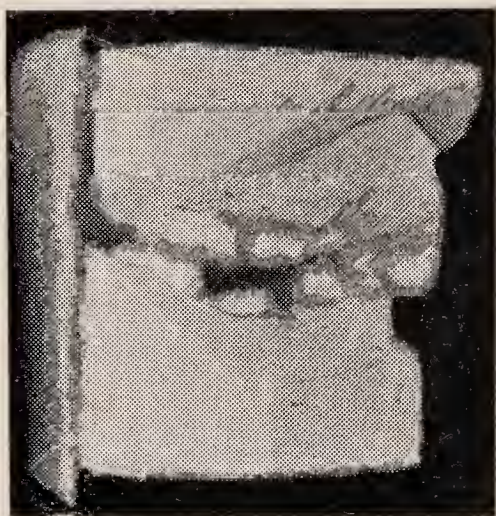


Fig. 3.



Fig. 4.

3rd Case.—N.P. Age 8 yrs. $\frac{6EDC21}{6E\ C21} \mid \frac{12CDE6}{12CD\ 6}$ present. Infraclusion of $\frac{ED}{E} \mid \frac{DE}{D}$. Early loss of $\frac{D}{E}$. X-ray, $\frac{54}{54} \mid \frac{45}{45}$ present.

4th Case.—S.M. Age 8 yrs. 8mths. $\frac{6EDC1}{6EDC1} \mid \frac{12CDE6}{12CDE6}$ present. Infraclusion of $\frac{ED}{ED} \mid \frac{DE}{DE}$ not shown very well in photograph in case of $\frac{E}{E}$. X-ray, all premolars present.

It does seem possible, however, that the cause is a lack of normal vertical development of the bone in the region of the deciduous molars which occurs particularly after the eruption of the first permanent molars. Following up the idea that the final disappearance of the tooth into a position of disinclusion was due to pressure by the approximal teeth, I wondered if the original infraclusion or infra position was due to lack of antero-posterior development of the arches. This is

not completely supported by the cases I have shown. The first two, brother and sister, have flat profiles, the third case (Fig. 3) had inferior retrusion and superior protrusion; here the infra position was limited to the mandible, but the last case (Fig. 4) had inferior protrusion with infra position in both jaws. All these models show tilting of the approximal teeth which may indicate abnormal pressure; perhaps from the lip anteriorly and the developing teeth behind.

Mr. Chapman and Mr. Lewin Payne have previously described cases of disinclusion, which is most probably the end result of this infra position.

Finally, as regards treatment, I extracted $\overline{E} \mid \overline{E}$ in one case and the $5 \mid 5$ were so deep that $6 \mid 6$ then tilted mesially and had to be moved back to allow the former to erupt.

The models are shown by permission of the Royal Dental Hospital.

In conclusion, I must express my sincere thanks to Mrs. Lindsay for her help in looking out literature on the subject.

The PRESIDENT described the communication as of very great interest. The models, he said, would be well worth studying, and he would be glad to talk to Mr. Ballard about them at the Royal Dental Hospital.

Dr. GEORGE NORTHCROFT expressed the hope that Mr. Ballard had taken radiographs of the cases shown, because he thought that the relationship of the permanent teeth, if present, was most important. Very often in his experience cases had occurred where the molars became submerged because there were no permanent teeth underneath, and X-rays would be most important.

Mr. VISICK said he had prepared models and slides of a somewhat similar case, that of two brothers, for a meeting of the Society about two years ago, but unfortunately it did not prove possible to show them. He came to the conclusion, as a result of trying to move these teeth, that it was something to do with the bone. The bone seemed hard and resistant to any movement whatever, even with the strongest spring. In the communication which he prepared he showed that the force put on the temporary molar was sufficient to depress the permanent molar into its socket. It was not a case of being wedged into place; it seemed to be immovable. One case belonged to Mr. Watkin, of Liverpool, and Mr. Watkin had a case of almost exactly the same kind; the four molars were all in infra-occlusion, and by extracting the teeth the permanent teeth came into place quite well. It seemed probable that it was a question of dense bone.

Mr. MARSH reminded members that just before the war Professor Korkhaus read a very important paper before the Society, in which he showed definitely that the six-year-old molar and its development was responsible for a good deal of bone growth, and that where it was extracted early a considerable amount of bone growth did not take place. Personally, he felt that these cases were in the nature of the exceptions which proved the rule; in other words, as the six-year-olds erupted fully they did deepen the bite, and normally the temporary molar teeth must come down with them. In a few isolated cases, however, that did not happen, and then the forward movement of the six-year-old tended to wedge them further in.

Mr. HAROLD CHAPMAN said that only that week he had seen an X-ray in which there was one of these lower deciduous molars very deep down, and the premolar was underneath it. A few years later that premolar had escaped and gone to the back of it, whilst the deciduous molar had still remained deep.

Mr. BALLARD said that in all the cases X-rays had shown that all the premolars were present. In one case in which he removed the deciduous molars to permit the second premolars to come through,

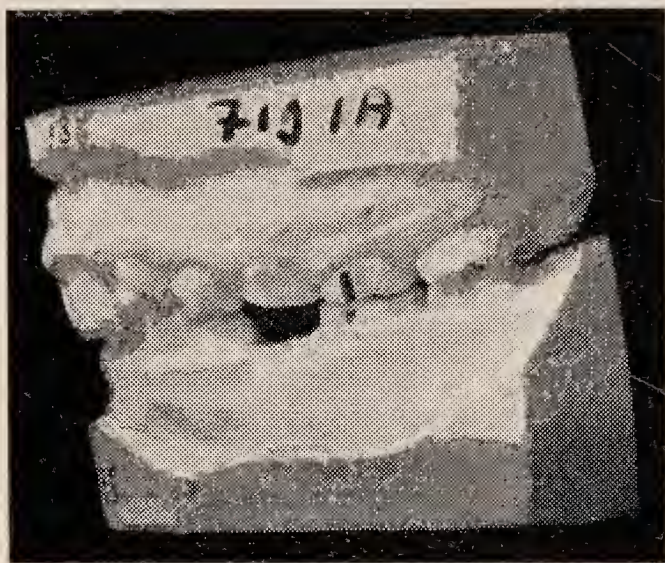
the other teeth had tilted forward and had occupied some of the space of those premolars before they had erupted, and he had to shift the permanent molars back.

The PRESIDENT asked whether, in those cases, the permanent premolars had come through.

Mr. BALLARD replied that they had, but it took some time.

(1) TREATMENT OF A CLASS II DIVISION II CASE WITH REMOVABLE APPARATUS AND WITHOUT EXTRACTION

By O. N. CATCHPOLE, L.D.S.Eng.



CASE No. 135. Age 11 yrs. 3 mths.
(Fig. 1A). Age 12 yrs. (Fig. 1B).

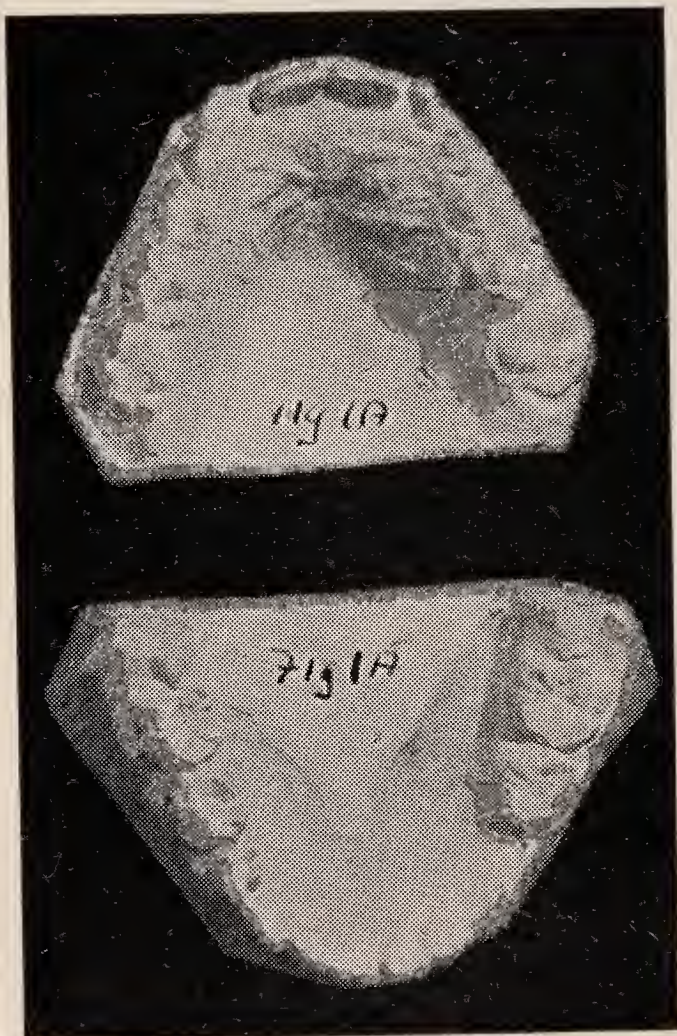
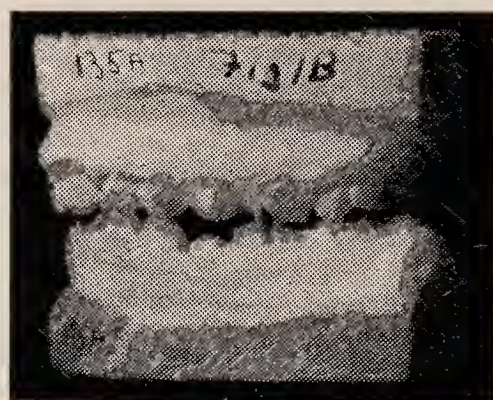


Fig. 1A.



Fig. 1B.

Diagnosis.—Typical Class II Division II of mild degree ; bilaterally half a cusp post-normal.

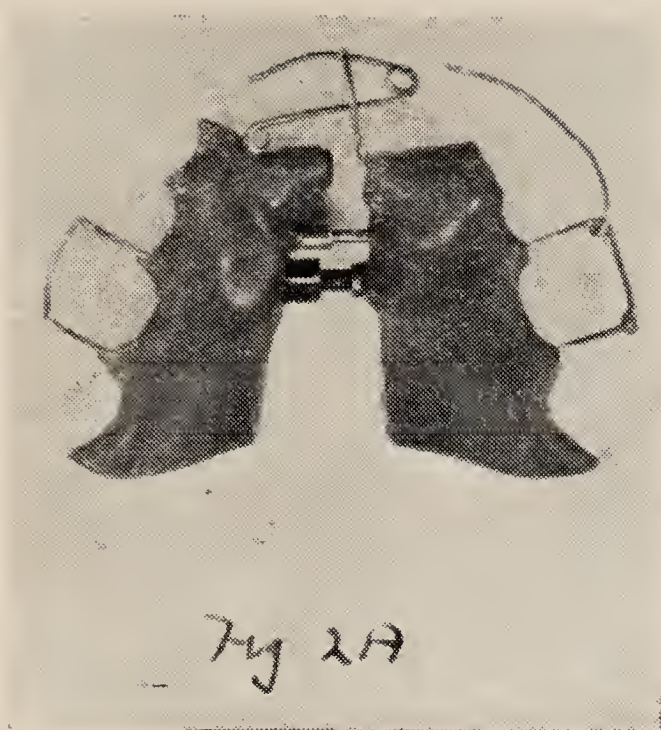


Fig. 2A.



Fig. 2B.

The case was treated with a saddle Badcock expansion plate carrying a spring to move the upper centrals labially with a spur (gauge 19) to keep the spring at the gingival margin (Fig. 2A). The plate was held in with a Visick clasp on the upper second deciduous molars and a spring was added to move the right upper lateral lingually. The upper left lateral was less displaced and came into line without treatment. The springs (gauge 22) and clasps (gauge 21) were made of stainless steel wire, the spring for the lateral being soldered at the distal aspect of the clasp. The plate was worn for four months and widened 2 mm.; during this time the lower jaw came forward without further treatment as the upper arch widened and the centrals were moved forward. The overbite was reduced 1.5 mm., though originally it was very little, if any, too great.

At the age of 11 yrs. 7 mths. a retention plate with an inclined plane (Fig. 2B) was put in with the object of retaining the alignment of the upper incisors and to assist in keeping the lower jaw forward. This is still being worn at age 12 yrs. (Fig. 1B).

(2) MISSING DECIDUOUS LATERAL INCISORS



The X-ray is of a female child, aged 5 yrs.

DISCUSSION :

(1) "Treatment of Class II Division II." O. N. Catchpole.

Mr. R. CUTLER suggested that a good deal of the disrepute into which removable appliances had fallen was due to their lack of positive fixation. Such appliances with positive locking could yield extraordinarily good results in cases such as Mr. Catchpole had shown.

(2) "Missing a Deciduous Lateral Incisor." O. N. Catchpole.

A questioner asked whether the missing deciduous laterals were followed by missing permanent laterals. In the literature, he added, there was very little information as to whether missing deciduous teeth were followed by missing permanent teeth, and, if that was sometimes the case, how often it occurred. Members of the Society probably possessed most of the information which was available on the subject.

The PRESIDENT said that one of the great difficulties was to get a record of what happened in cases where deciduous incisor teeth were concerned. One could obtain only the information which the parents could give, and that, unfortunately, often proved to be quite incorrect.

Mr. HAROLD CHAPMAN said he had heard of one or two cases recently in which there had been absence of deciduous teeth but the permanent ones were present. Unfortunately, he had no definite information at present, but if he heard of them again he would try to get particulars. It did seem, however, that the absence of the deciduous teeth was not necessarily followed by the absence of permanent teeth.

Mr. CATCHPOLE said that in the case in question the mother did appreciate that it was an unusual and interesting condition. She and her child had been evacuated, and her previous dentist had told her of the possibility. He himself took X-rays, and he gave one to the mother to stimulate her interest, so that the case might come back through somebody else at some time in the future.

The PRESIDENT asked whether the X-ray showed any evidence of the permanent laterals.

Mr. CATCHPOLE replied that it did not.

(1) CASES IN WHICH A PERMANENT UPPER CENTRAL INCISOR HAS BEEN REMOVED

By HAROLD CHAPMAN, L.D.S.Eng.

CASE No. 2915. F. models aged 9 yrs. 11 mths. and 13 yrs. 8 mths (Fig. 1)

Diagnosis.—Class II Division I. Right $\frac{1}{2}$ cusp post-normal; left $\frac{1}{2}$ cusp post-normal.

History.—Sucked thumb till age 6. Right upper permanent central incisor broken at age 8 yrs. 9 mths.; extracted at age 10.

Treatment.—Treated with fixed appliances, upper and lower lingual arches and upper buccal arch, and intermaxillary traction. The left upper central incisor has been moved to the right. Tooth movement complete in one year; the same appliances worn for retention with intermaxillary traction for $2\frac{1}{2}$ years more till age 13 yrs. 7 mths., when all appliances discarded. The left upper central incisor has been ground: it is anticipated the spaces on either side of it will close further by medial movement of all the teeth. The occlusion of the right side is perfect, but the left side remains $\frac{1}{2}$ cusp post-normal.



Fig. 1. Case No. 2915F. Models age 9-11 and 13-8.

CASE No. L.H.953. M. models age 14 yrs. and 14 yrs. 4 mths. (Fig. 2).

Diagnosis.—Class II Division I with good lower arch but relatively greater narrowness of the upper one, so that the occlusion on the right upper side is lingual to the lower. The upper incisors are considerably imbricated and the centrals rotated.

History.—The pulp of the upper left central was dead, so this tooth was removed and the remaining three incisors aligned with a satisfactory result. At this time the pulp of the right upper central incisor was found to be dead: the tooth has been treated. The alignment of the three upper incisors is being retained by means of a band on the central incisor with lingual spurs to the upper lateral incisors.

Treatment.—Tooth movement was by means of an uppersaddle vulcanite plate with springs to move the upper lateral incisors labially and the upper central incisor lingually and to the left: it was also rotated. The springs were kept in position with spurs.

(See page 73.)

CASE No. L.H.976. M. age 9 yrs. 6 mths.

Diagnosis.—Right side $\frac{3}{8}$ cusp post-normal, left side $\frac{1}{2}$ cusp post-normal. Small arches. Class II Division I, atypical.

Treatment.—Extraction of the left upper central incisor, which is rotated, and moving the right upper central incisor to the left and lingually. The two upper laterals are in fairly good relation to the lower incisors, but the lower laterals are lingual to the line of the teeth and are not likely to correct themselves: treatment is not advised for the lower teeth.

CASE No. L.H.307. M. models age 14 yrs. 1 mth. and 18 yrs. 2 mths. (Fig. 3).

Diagnosis.—Class II Division I; good arches; atypical; the right upper central incisor is entirely outside the line of the arch. The other upper incisors are not much in advance of the lower incisors. The mother says the right upper central incisor is becoming more prominent: this might be so: only roots of the first lower permanent molars remain and the spaces are closing, so the lower arch may be getting smaller and with it the upper one, thus crowding out the right upper central incisor more than originally.

Treatment.—The right upper central incisor was extracted: no other treatment. Four years later the space between the right upper lateral and the left upper central incisor has almost entirely closed and the alignment and occlusion of the teeth is excellent. No apparatus was used.

(See page 74.)

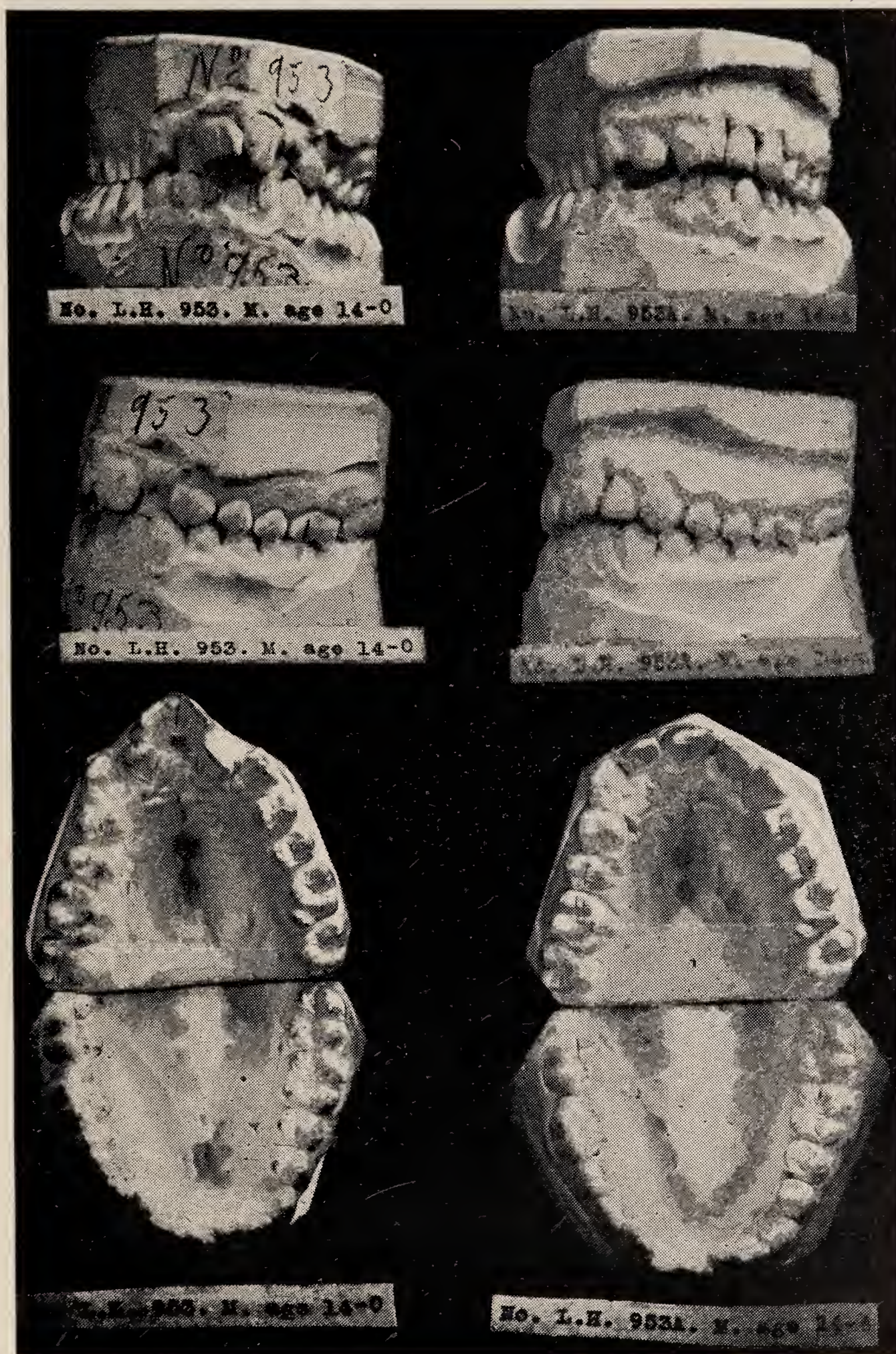
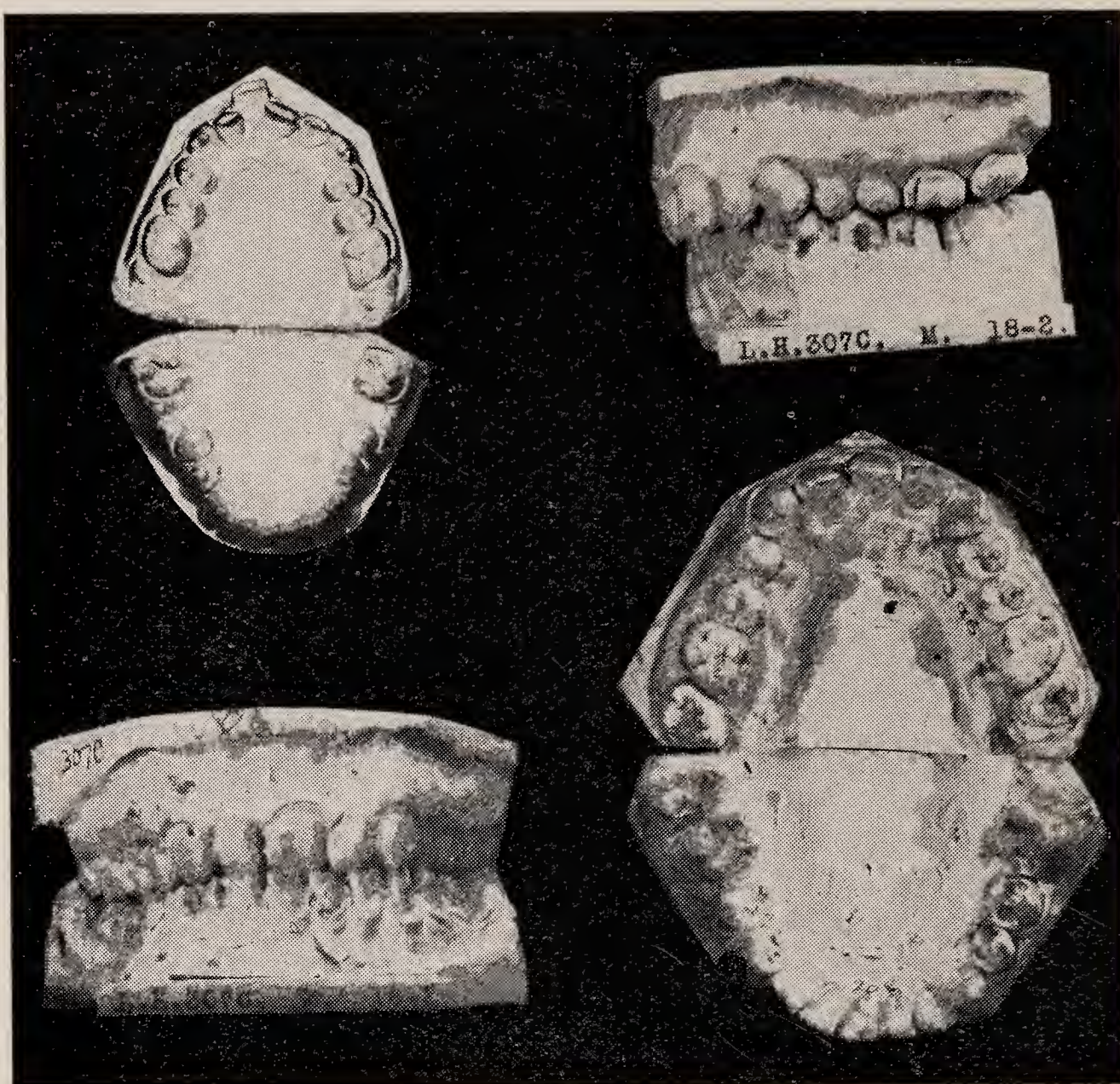


Fig. 2. Case No. L.H. 953 M. Models age 14-0 and 14-4.



[Fig. 3. Case No. L.H. 307. Models age 14-1 and 18-2.

(2) THE EFFECT OF INFANT FEEDING ON OCCLUSION

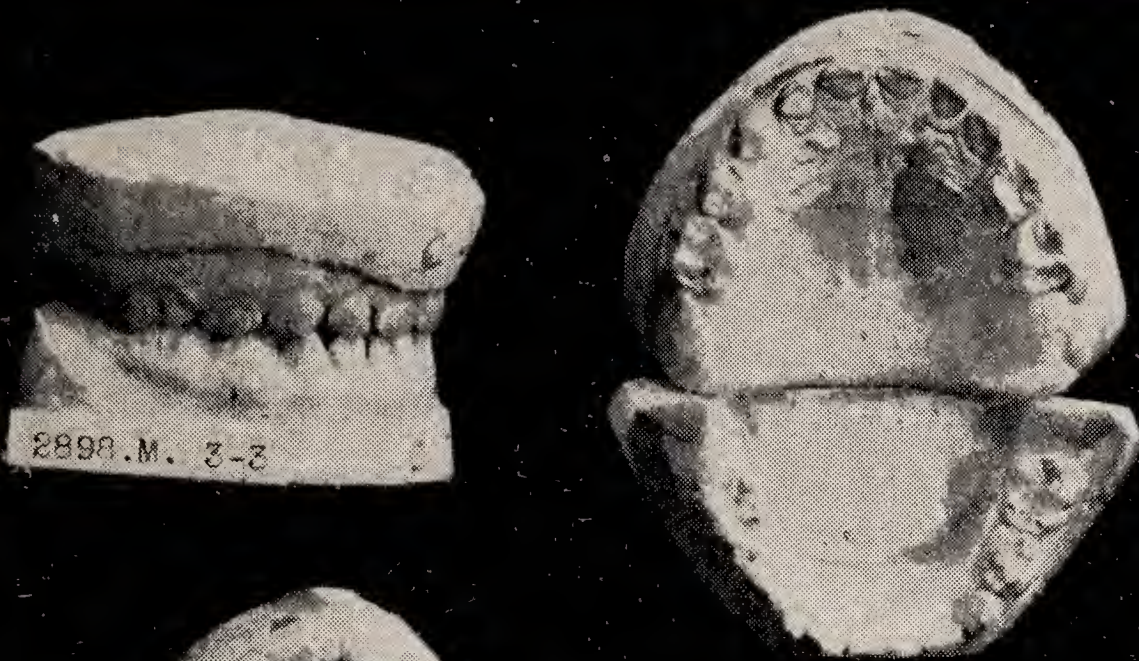
By HAROLD CHAPMAN, L.D.S.Eng.

Recently (in 1941) there has appeared in the *British Dental Journal* correspondence relating to the effect of different methods of infant feeding on occlusion. Only a few years ago similar correspondence appeared in that journal, but in neither case has our knowledge been carried further. My object in referring to this is to remind the profession that our knowledge could be increased if those interested in the subject would take models and obtain histories on this point of all types of occlusion.

There is in the museum of the British Society for the Study of Orthodontics a long series of models of the same individual from age 2 yrs. (approx.) to age 34 yrs. 8 mths., illustrating a beautiful example of normal occlusion (Fig. 1, Case No. 2898). This individual, who is a member of our Society was, in the words of his father, a former president of this Society, "brought up on the bottle." (In a private letter to Mrs. Lindsay, the librarian of the British Dental Association, dated December 26th, 1929, he (Mr. William Rushton) writes: "I have three children aged 28, 26 and 24, all brought up on the bottle.")

There was also shown Case No. 572, F. age 20 (Fig. 2), who was breast fed for 9 days only: this showed a very good occlusion, though not as perfect as the previous one.

(A)



(B)



(C)

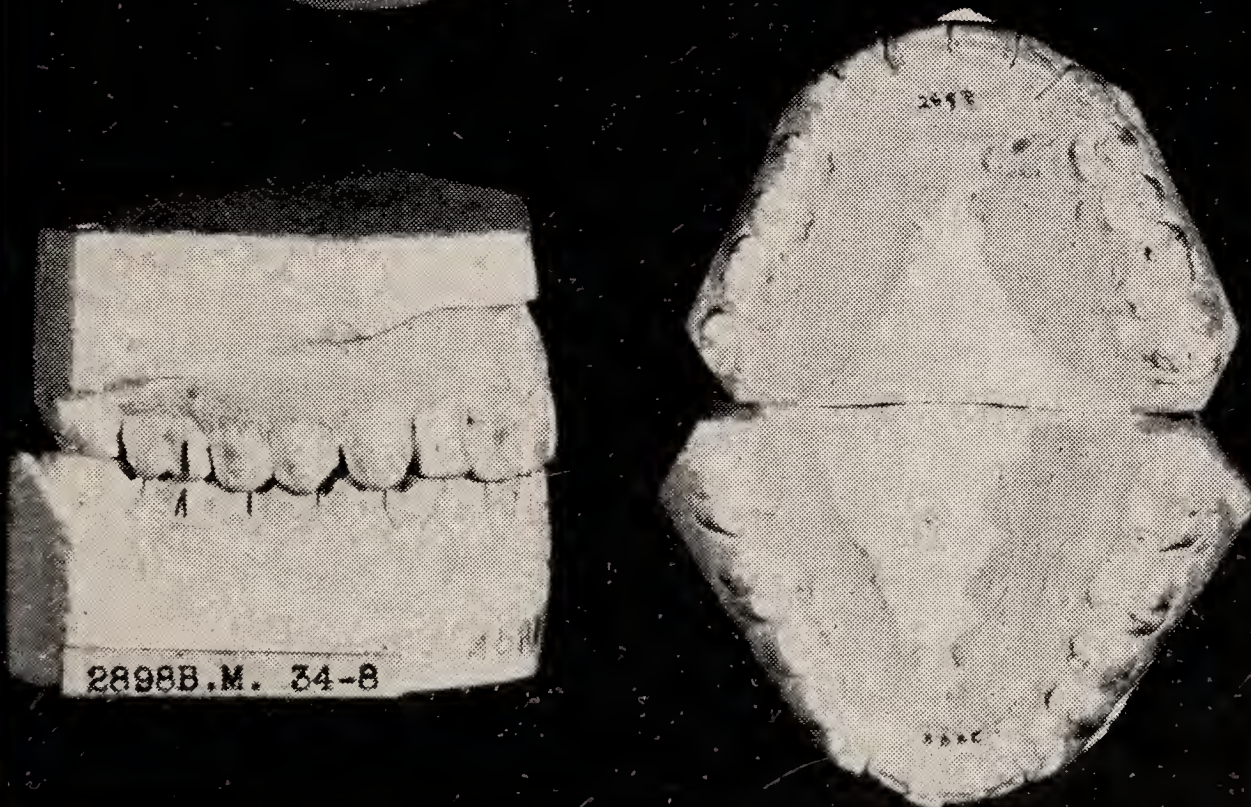


Fig. 1.
 (A) Case No. 2898 M. Age 3-3.
 (B) Case No. 2898A. M. Age 9-8.
 (C) Case No. 2898B. M. Age 34-8.

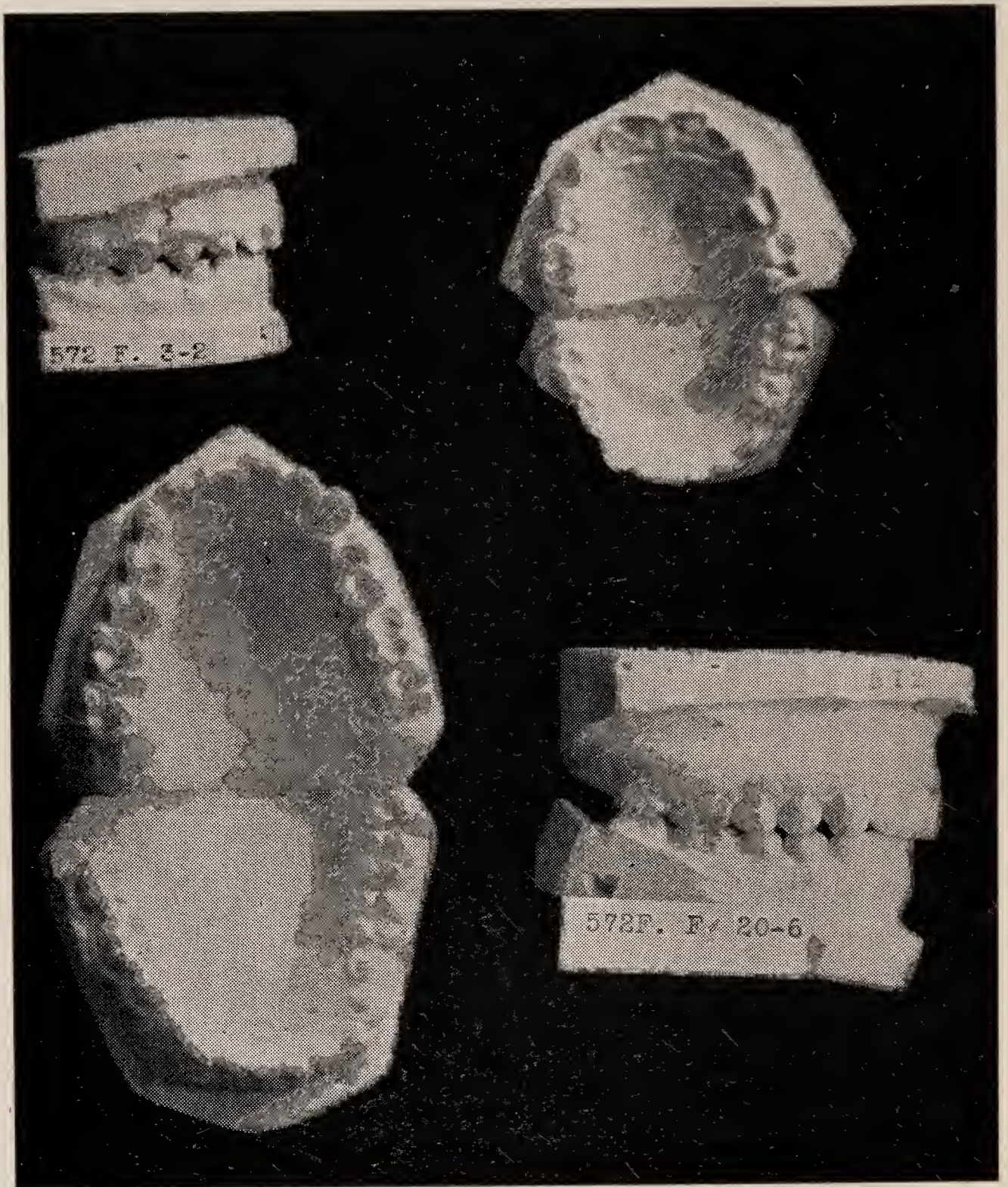


Fig. 2. Case No. 572 F. Models age 3-2 and 20-6.

Two further cases were exhibited, No. 333, M. age 13 yrs. 9 mths., Class II Division I, with good arches, breast fed for 9 months; and Case No. L.H.2, M. age 13 yrs. 9 mths. (Fig. 3), also Class II Division I, with small arches, breast fed for 9 to 12 months. (Fig. 3.)

The first two cases illustrated are examples of good occlusion; the individuals were bottle fed: the other two cases are examples of mal-occlusion; the individuals were breast fed for 9 months.

DISCUSSION :

- (1) "Cases in which a permanent upper central incisor has been removed." Harold Chapman.
- (2) "The effect of infant feeding on occlusion." Harold Chapman.

Mr. STURROCK wished to emphasise how inconspicuous such irregularities were where one incisor had been taken out and where the incisors were off the middle line. He had had at least two patients who had been treated by Mr. Chapman a good many years ago, where the upper premolar at one side and the lower premolar on the opposite side had been taken out, and the consequence was that the central

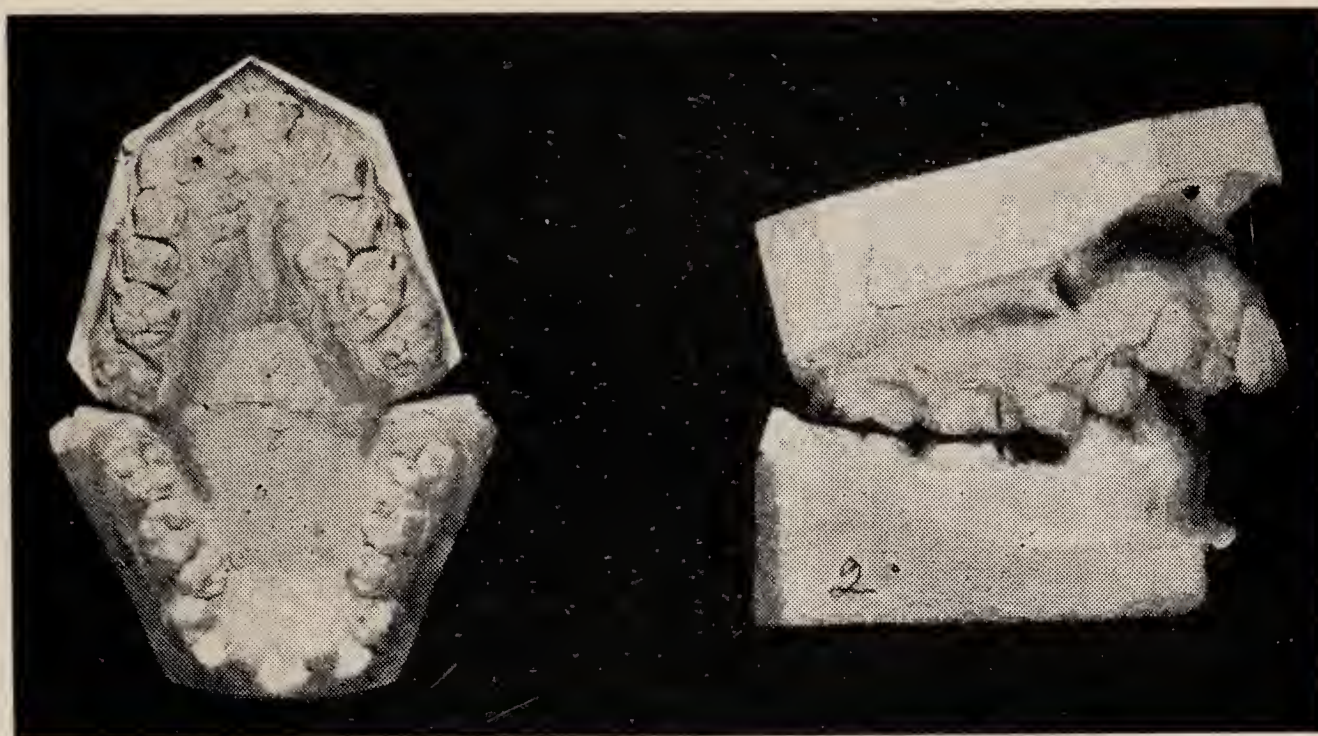


Fig. 3. Case No. L.H.2 M. Models age 13-9.

line was quite a long way out, but no one would notice anything unusual. They were both strikingly good-looking, and nobody would notice the irregularity. A long course of treatment would give no better results.

Mr. MAXWELL STEVENS said it was a great help to see cases of the kind in question put forward in such a way; it gave one confidence in deciding what to do when they suddenly presented themselves at one's surgery. With a Class II case one knew that one had a unit or half a unit to play with, and one wanted to bring the incisors back to close it in; but where there was normal occlusion it was much more difficult, because the only way to right the position then was to remove an incisor or a premolar at the side of the lower jaw so as to make the arch smaller. He had a case at the present time where he asked the mother whether she would allow him to remove the lower incisor at the same time and get a unit from that arch, but she would not. He had not seen the child lately but he did not think there was any chance that the space would close in. Another point was that where there had been a blow, it frequently happened that the incisor which was left had also received a blow, and in the course of time it might be found that that tooth would require devitalising, or it might be that ultimately there would be a change in the structure of the tooth with a yellowing appearance, the pulp not being actually dead. It would be interesting to hear what someone with large experience of such teeth had to say on the matter.

Miss CLINCH, referring to Mr. Chapman's second communication, said that of the many hundreds of infants that she had examined and about whom she had notes, she could find no proof that whether they were breast-fed or bottle-fed made the slightest difference as regards the formation of the jaws in later life. With regard to the first communication, she agreed that the results were very good, but said that if the teeth were vital and could be kept she thought that a better result could be obtained without extracting incisors. That, however, was merely her opinion.

(Lack of time prevented a continuance of the discussion. Mr. Chapman has sent the following reply.—ED.)

A few years ago Mr. Packham showed a case before the Society of normal occlusion in which there was only one upper central incisor,

and he, Mr. Packham, did not notice this at once, showing that the condition does not necessarily immediately attract attention.

In a case of Class II Division I (not referred to in the paper) in which an upper central incisor had been knocked out by a cricket ball, he, Mr. Chapman, was closing the space, but as this proceeded he felt the result would be unsatisfactory, and decided to maintain the space: each case must be judged on its merits. In two of the cases referred to in the paper, the pulps of the extracted teeth had died.

In my opinion, in the case of the single very prominent incisor (Fig. 3), no other treatment could have given so satisfactory a result as was shown in this case four years after the tooth had been removed; there was no treatment except the extraction. In the third case, not illustrated, the four upper incisors were very irregularly placed, and it has been my experience that such teeth are extremely difficult to retain permanently in good alignment. I agree it is quite easy to align them, but relapse occurs sooner or later, and I feel that in the case of this boy, the removal of a much misplaced central incisor will enable a most satisfactory result to be obtained in a comparatively short time.

With regard to infant feeding, he intended to point out that Miss Clinch's research work on the size and relationship of the jaws at birth showed that conditions, such as small arches and post-normal occlusion, existed then which had been reputed to be brought about by bottle feeding.

In connection with this discussion, the following quotations from R. McNair Wilson's "British Medicine" (1941) are appropriate, and carry a lesson for the orthodontist.

"Sir James Mackenzie, having failed to obtain enlightenment from books or colleagues, set himself the task of observing what happened to his patients in course of time—an obvious but largely neglected source of information.

"He urged his students to undertake research work of a clinical kind. He taught that the true test of a doctor's skill is his power to make an accurate prognosis, since that power represented the sum of all other activities.

"British orthopædic surgery is without equal in the world because it has been kept free from mass production methods."

ASYMMETRICAL UPPER INCISOR TEETH

By LILAH CLINCH, L.D.S.Ireland.

Three cases were shown in which the upper incisors were asymmetrical. In the first case (Fig. 1) the width of the upper right central was 11.5 mm. and of the left central 9 mm. In order to make room for the very large central on the right, it was necessary to extract the first premolar on that side. There was not very much space to spare even then (Fig. 1A).

In the second case (Fig. 2), which again concerned the two central incisors, the upper right central was 9 mm. and the left central 6 mm. The central line moved to the left in this case, and in that way made the occlusion fair in the molar-premolar region.

In the third case (Figs. 3 and 3A) all four incisors were of a different size. The upper right central was 10 mm. and the upper left central 7 mm. The upper right lateral (which could be seen lying lingually to the deciduous lateral and canine) was 5 mm., and the upper left lateral 8 mm. Actually, if the measurements of the two incisors to the right were added they equalled the combined widths of the two to the left. It was of interest that the upper left canine was a very peg-shaped tooth. It was 5.5 mm.

There were no supernumeraries present in any of the cases.

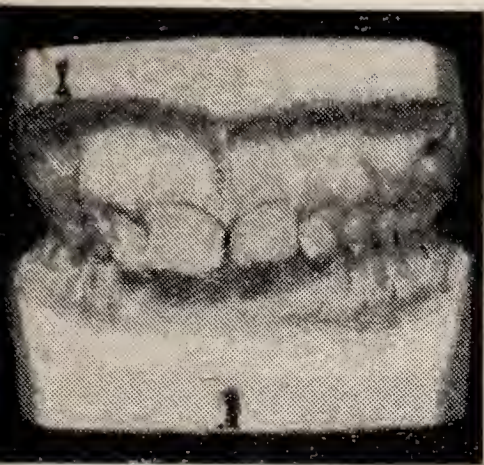


Fig. 1.

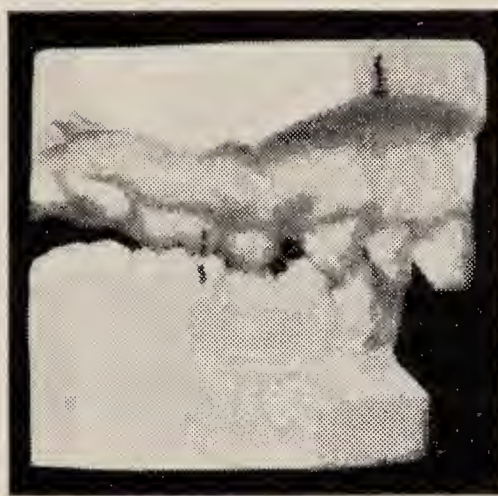


Fig. 1A.

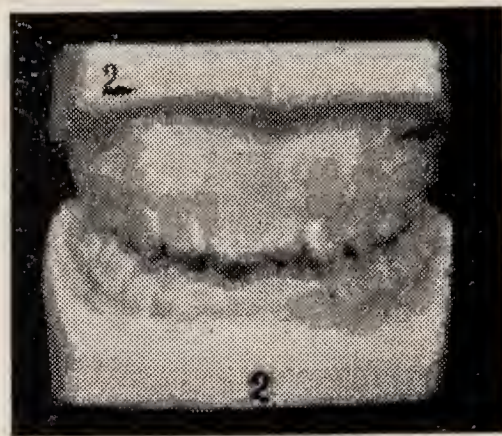


Fig. 2.

- (1) Asymmetrical central incisors.
Measurements. $\underline{1}$ 9 mm., $\underline{1}$ 11.5 mm.
- (1a) The upper right first premolar has been extracted to compensate for the difference in size of the central incisors.
- (2) Asymmetrical central incisors.
Measurements. $\underline{1}$ 9 mm., $\underline{1}$ 6 mm., $\underline{2}$ and $\underline{2}$ 7 mm.
The centre of the upper has moved to the left to compensate for the difference in size of the central incisors.

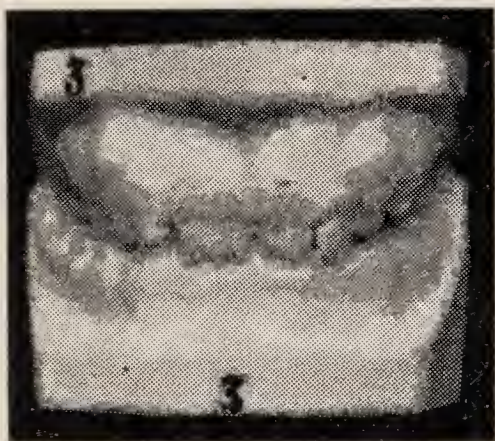


Fig. 3.

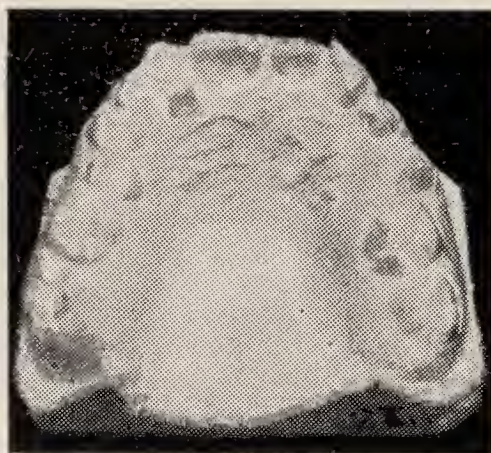


Fig. 3A.

- (3) Asymmetrical central and lateral incisors.
Measurements. $\underline{1}$ 10 mm., $\underline{1}$ 7 mm., $\underline{2}$ 5 mm., $\underline{2}$ 8 mm.
Combined widths of central and lateral incisors on both sides is the same.
- (3a) Occlusal view of upper arch showing lingual placement of $\underline{2}$.

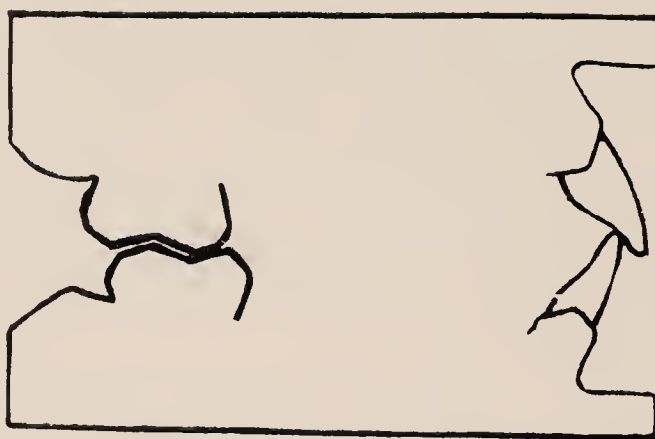
Dr. GEORGE NORTHCROFT congratulated Miss Clinch on collecting such an interesting series of models. In the second case shown, it seemed to him possible that the left upper lateral and central had become alternated. The laterals looked to him as if it was wider than the central, and he wondered whether the two teeth had not got changed over, so that the lateral was taking the place of the central. He thought that the cases were most interesting.

A DENTAL CHARACTERISTIC OF THE JEWS

By R. ERNEST RIX, M.R.C.S., L.R.C.P., L.D.S.Eng.

Models of eleven cases were demonstrated showing in varying degrees of intensity a comparatively uncommon feature. The lower incisors inclined more forwards than would be considered normal.

The real interest of the group lay in the fact that all the models were of Jewish children. Occasionally, however, similar appearances were met in what were, as far as could be ascertained, typically English children, but there was a high chance of the possessor of "labio-clinated" lower incisors being a Jew.



The diagram illustrates the condition. The incisive edges of the lower incisors were more forward than would be considered usual and the upper incisors were often also labio-clinated.

When the incisor overlap was excessive the upper incisors, of course, were markedly labio-clinated. One or two of the cases shown were of this description, and incidentally the vulnerable central incisors had been fractured. If the incisor overlap were lessened the inclination of the uppers could be improved.

Others in the group were post-normal occlusion cases, bilateral and unilateral. Their treatment did not seem to proceed to the same successful conclusion to which one hoped to take the usual type of post-normal case, the inclination of the lower incisors often preventing the complete retraction of the labio-clinated upper incisors.

In a short communication it was not possible to dwell on the individual points of interest in the group, but there was a further feature which was apparent in all cases except one. The dental arches were well developed and broad.

The British Society for the Study of Orthodontics

REPORTS OF MEETINGS

An Ordinary Meeting of the Society was held at Manson House, 26, Portland Place, London, W.1, on Monday, February 26th, 1940, at 6.30 p.m. The President, Mr. S. A. Riddett, occupied the chair.

The minutes of the Annual General Meeting, held on December 11th, 1939, were read, and they were confirmed and signed.

The PRESIDENT, speaking on behalf of the members, thanked Mr. Chapman for agreeing to occupy the position of Honorary Treasurer of the Society for the remainder of the year. The members were very glad to welcome any ladies and gentlemen present who were not members of the Society. He hoped they would take part in any discussion and consider themselves full members for the evening.

An Ordinary Meeting of the Society was held at Manson House, 26, Portland Place, London, W.1, on Monday, April 1st, 1940, at 6 p.m. The President, Mr. S. A. Riddett, occupied the chair.

The minutes of the previous meeting, held on February 26th, 1940, were read, and were confirmed and signed.

The PRESIDENT referred with regret to the death of Mr. William Rushton, a former distinguished member of the Society.

He then welcomed the visitors who were present, and invited them to consider themselves members of the Society for the evening, and to take part in any discussion. He wished to remedy an omission that he had made at the last meeting. Mr. Visick had been present then, as he also was this evening, and he was sure all the members were very glad to see Mr. Visick amongst them again.

Annual General Meeting, 1940

The Annual General Meeting of the Society for the year 1940 was held at Manson House, 26, Portland Place, London, W.1, on Monday, December 2nd, 1940, at 12.15 p.m. The chair was occupied by the President, Mr. S. A. Riddett.

The minutes of the last Ordinary Meeting, held on May 6th, 1940, were read by the Honorary Secretary and were confirmed and signed.

REPORT OF THE HONORARY TREASURER

The HON. TREASURER (Mr. Harold Chapman) reported as follows :—

Members will recall that the subscription for 1940 was rescinded. The income for the year is £14 os. 2d., being £13 10s. 2d. interest on investments and 10s. from the sale of one copy of the *Transactions*.

Expenses have not been reduced correspondingly, as we had commitments under two leases, which terminated last September; these have not been renewed. Three meetings have been held. Rent and refreshments cost £53 6s. 6d., printing and *Transactions* for the year 1939 £41 9s. 0d., reporting £12 12s. 0d., and sundry expenses

£34 17s. 6d., making a total of £142 5s. 0d., as compared with £215 19s. 4d. last year.

The loss on the year's working is £240 4s. 5d.

£125 6s. 0d. has been invested in 2½ per cent consuls.

The balance carried forward is £59 18s. 7d. (which includes two guineas for subscriptions paid for 1941), compared with £300 3s. 0d. brought in from last year.

The only outstanding liabilities are for the *Transactions* for 1940, which I estimate at £25, £5 per annum for housing the Society's property, which has been moved from 13, Hill Street, to Manson House, and some small accounts. The bank balance, plus interest, should suffice to pay these sums, which will be due for payment next year.

If meetings are held, the Council will have to consider how the expenses are to be met. An arrangement has been made for single Ordinary Meetings to be held at Manson House at a charge of three guineas each.

With regard to our assets, we have 500 National Savings Certificates, which cost £400, and their value to-day is £659 2s. 4d. (it is really rather more, because the value is taken for a complete year, and there are odd months); 2½ per cent Consolidated Stock which cost £525 11s. 6d., the value of that to-day being £397 13s. 9d.; cash at Bank £59 18s. 7d., less two guineas for subscriptions paid in advance, and cash in hand (Secretary and Treasurer) £2 9s. 7d. That makes a total of £1,117 2s. 3d.

Mr. S. B. NEWTON, in moving the adoption of the Report, said he had been one of the Auditors and could assure the members that the balance as quoted by Mr. Chapman was recorded in the bank pass-book.

The resolution was seconded by Mrs. L. LINDSAY, who congratulated the Honorary Treasurer on making the best of a bad job, and was carried unanimously.

REPORT OF THE HONORARY SECRETARY

The HON. SECRETARY (Mr. R. Cutler) read the following Report:—

It may be recalled that at the Annual General Meeting in December last, certain radical developments of Society policy were formulated and after amendment, approved, so that it might prove possible to maintain a measure of activity in spite of the war situation. Two major points in these developments were the continuation in office of the Members of Council elected for 1939 and the foregoing of the annual subscription for this year.

In pursuance of the policy of maintaining activity, meetings were held on February 26th and April 1st, and a demonstration meeting on May 6th, but after that date the increase in enemy air action made further Ordinary Meetings impracticable or undesirable. Several Council Meetings were held, however, after that date, to study the situation as far as the Society was concerned, and certain further proposals have now been formulated and are submitted to the meeting for discussion and approval.

At the beginning of the year Mr. H. R. Evans was called for war service, and we have been fortunate in securing the services of Mr. H. Chapman for the remainder of the current year. Mr. Rushton has been unable to attend Council meetings, owing to his appointment to the Emergency Medical Service, and last month Miss Smyth tendered her resignation as Librarian. To this office Mr. Gordon Taylor, a Member of Council, has been elected, but the constitution of the Council in other respects remains unchanged.

Our agreement with the owners of Manson House terminated in September last, but we are fortunate in being able still to make use of the facilities here for a very reasonable hiring fee, and we have reason to believe that this arrangement can be continued if the need arises. Our Curator will give a full account of the developments in connection with the Library and Museum, and in this connection the Manson House authorities are now helping us in regard to the housing of books and cabinets.

It is to be regretted that there has been such a curtailment of the Society's activity, but the meetings held were, under the circumstances, well attended, and due appreciation has been recorded to those who gave and supported the papers and demonstrations.

The PRESIDENT said that the Report of the Honorary Secretary reflected very admirably the activities of the Society, and, on the proposition of Mrs. LINDSAY, seconded by Mr. G. TAYLOR, the Report was adopted.

REPORT OF THE HONORARY LIBRARIAN AND CURATOR

Owing to the resignation of Miss Smyth from the office of Librarian, Miss L. M. CLINCH embodied the Librarian's Report in her Report as Curator and said: Up to the end of 1937 the Museum was housed in the gallery at Manson House and the Library in Miss Smyth's rooms in Devonshire Place. It was then decided by the Council that arrangements should be made whereby members could use both the Museum and the Library in comfort. With this end in view a room was taken from the British Dental Association at 13, Hill Street. Despite the fact that this room was furnished and arrangements were made for the Librarian to be there at certain times, it was found that the use made of these facilities was negligible. In May, 1940, the Council, therefore, decided to terminate the lease for this room when it expired in September, as the Museum and Library furniture could be housed at a very much lower rent at Manson House. It is for this reason that the cases have been moved back to the gallery there. At present many of the Museum specimens have been moved out of the cases for safety, but when the danger of air raids is past they will once again be there for those who may wish to examine them.

It was agreed by the Council that the aim of the Society should be to have, at some future date, its own premises for meetings and for the Library and Museum, and that any reasonable economies which could be effected would be desirable in an effort to bring this date nearer.

ANNUAL GENERAL MEETING

Saturday, December 6th, 1941.

THE Annual General Meeting of the Society was held at Manson House, 26, Portland Place, London, W.1, on Saturday, December 6th, 1941, at 1.45 p.m., Mr. S. A. RIDDETT, M.C., President, occupying the chair.

The minutes of the previous Annual Meeting, held on December 2nd, 1940, were read by the HON. SECRETARY, and were confirmed and signed as correct.

REPORT OF THE HONORARY TREASURER.

Mr. HAROLD CHAPMAN (Hon. Treasurer) reported as follows: The Council had decided that no subscription should be payable for 1941. The income for the year was £15 19s. 8d., derived entirely from interest on investments, and the expenditure was £32 7s. 9d., leaving a deficit

of £16 8s. 1d. The only outstanding liabilities were the 1940 *Transactions* and the cost of the present meeting.

He had increased the insurance policy on the Society's property to £500 for fire, burglary, etc., so as to be in accord with present-day values. Some of the Society's property was damaged on the night of September 18th-19th, 1940, and a claim for £39 19s. 9d. had been sent in to the district valuer. The Society's property had been insured for £500 under the War Damage Act, 1941, and the premium paid up to March, 1942.

The Inland Revenue authorities had recognised the Society as established for charitable purposes only. The effect of that was that there would be no liability for income tax on income from investments received without deduction of tax. The value of the Society's investments at November 10th, 1941, was £1,200, and the assets totalled £1,240. In addition, the Society owned three cabinets for keeping models, etc., and other furniture worth £500.

On the motion of Dr. GEORGE NORTHCROFT, seconded by Mr. MAXWELL STEPHENS, the report was received.

Dr. NORTHCROFT asked, as a matter of curiosity and interest, how the sum of £32 odd referred to had been expended.

Mr. HAROLD CHAPMAN said the expenditure included such items as Manson House, £8 odd; War Damage Act insurance, £11 5s.; fee for assessment of war damage, £2 2s.; reporting, £4 4s.; and petty cash for Hon. Treasurer and Hon. Secretary, £1 2s. 6d.

The PRESIDENT, on behalf of the Society, thanked the Hon. Treasurer for all the work he had done, which had been particularly onerous during the past year.

The Hon. Treasurer's report was unanimously adopted, on the motion of Mr. MAXWELL STEPHENS, seconded by Mr. BUTCHART.

REPORT OF THE HONORARY SECRETARY.

Mr. R. CUTLER (Hon. Secretary), said that, as the President would detail the Council's activities since the last Annual General Meeting, there was little for him to report, other than that it would be noted that Mr. Gordon Taylor now held the office of Librarian, and that Mr. Leith Winn had been elected a Councillor in Mr. Taylor's place, the constitution of the Council remaining in other respects unchanged.

Every effort was being made to keep the Members' Address List fully corrected, but the co-operation of members in this respect was essential. The *Transactions* for 1940, after many vicissitudes due to enemy action, were now in print, thanks to the efforts of the Hon. Editor and of the proprietors of the *Dental Record*, and it was hoped that they would be circulated early in the new year.

Although there had been no meetings, the Council had maintained a close watch on the situation, and would welcome suggestions from members at any time.

The report of the Hon. Secretary was received, on the motion of Mr. JOHNSON, seconded by Mr. RIX, and was unanimously adopted on the motion of Mr. RUSHTON, seconded by Mr. RIX.

THE "TRANSACTIONS."

The PRESIDENT said that Mr. Rix, the Hon. Editor, had been working very hard for the Society, and perhaps he would say a few words about the *Transactions*.

Mr. R. E. RIX (Hon. Editor) said there had been some trouble with the production of the *Transactions* for 1940. The blocks and MSS. were "blitzed" and totally destroyed; material was then gathered together again, and preparations made for its production,

but this too was destroyed. A third attempt was then made, and matters were now fairly well in hand. There might be one or two omissions, but, so far as he could tell at the moment, no serious ones. He hoped that it would be possible to send out copies early in the new year.

STATEMENT BY THE PRESIDENT.

The PRESIDENT said he had been very remiss in not welcoming Mr. Leith Winn to the Council Meeting. He desired now to welcome Mr. Winn both to the Council Meeting and to the Annual General Meeting. The members would be very glad to have Mr. Winn's services as a Councillor of the Society.

The members ought really, he remarked, to congratulate themselves on having come safely through the epoch-making events of the past year. He was glad that the presidential badge of office had been saved ; it had a very narrow escape at 42, Harley Street in September, 1940. He would like to thank the members who had taken the trouble to come, in some cases long distances, to make the present meeting, a success. An Annual General Meeting was a formal affair as a rule, but on the present occasion, owing to the enthusiasm of a number of members, many interesting communications were to be presented, for which he would like to thank the contributors in advance. Mrs. Lindsay deserved especial thanks for undertaking to arrange the programme.

THE SOCIETY'S POLICY.

Continuing, the President said that the proposals, of which members had received notice, would explain the policy of the Society. The Council, as they would have gathered, had carried out quite literally the injunctions of the members at the last General Meeting, and no Ordinary Meetings had been held, although the Council had met from time to time. Incidentally, most members would have received the notice of the next Annual General Meeting of the British Dental Association, whose policy had been on the same lines as that of the Society.

As had already been stated, it was hoped that the *Transactions* for 1940 would soon be available ; and, as the Secretary had said, the Council would welcome any suggestions from members. Personally, he did not propose to militate against the success of the meeting by talking any longer. He would therefore conclude, after again thanking the members present for their attendance, by submitting for approval the proposals to which he had referred, which were as follows :

(1) That payment of the subscription due on January 1st, 1942, be deferred pending a further discussion by the Council.

(2) That the officers for 1942 be the same as those holding office at the end of 1941.

(3) That Ordinary Meetings be suspended until the Council decides otherwise.

Those proposals were open for discussion, but, if no one desired to speak on them, he would ask permission to put them *en bloc*. (*Agreed.*)

The proposals were put and carried unanimously.

Short communications were then delivered.

VOTES OF THANKS.

The PRESIDENT moved a very cordial vote of thanks to those who had made the meeting such a success from the scientific point of view, and apologised for having had to hurry the contributors in some cases. It would have been possible, he said, to occupy four meetings

very profitably with the material which had been presented that afternoon.

The vote of thanks was carried with acclamation.

The PRESIDENT added that thanks were due to the officers and Council. They had not been idle, as the Hon. Secretary could well testify.

Mr. R. CUTLER proposed a vote of thanks to the President for his help during the year. The President, he said, had supervised the activities of the officers, kept the Council in order, and done his utmost to preserve the continuity of the life of the Society.

The vote of thanks was carried with acclamation.

The PRESIDENT, in acknowledging the vote of thanks, said he would prefer some one else to take over his office, but in time of war it seemed the usual thing for the President to remain in office.

The meeting then ended.

BRITISH SOCIETY FOR THE STUDY OF ORTHODONTICS
STATEMENT OF ACCOUNTS, 1939-1940

[illegible]

ASSETS.		£	s.	d.
1939-1940.				
500	National Savings Certificates (Cost Price £400).			
	Value 1940 (excluding odd months)	..	..	..
2½	Consolidated Stock £639 13s. 3d. (Cost £525 11s. 6d.)			
	Value November 27th, 1940	..	..	..
	Cash at Bank	..	..	..
	Less Subscriptions paid for 1941 ..	£59	18	7
		2	2	0
	Cash in Hand—			
	Secretary	..	..	..
	Treasurer	..	..	..
	Librarian (no figures received, probably under £1)			
		2	9	7
		57	16	7
		£1,117	2	3

We have examined the Books and Vouchers and certify the above Statement of Accounts to be correct.

(Signed) W. LESLIE BONESS.
SYDNEY B. NEWTON.

December 2nd, 1940.

THE BRITISH SOCIETY FOR THE STUDY OF ORTHODONTICS
STATEMENT OF ACCOUNTS, 1940-1941

RECEIPTS, 1940-41.		PAYMENTS, 1940-41.	
To Interest on Investments	£ 15 19 8	To Rent Manson House	£ 8 3 0
„ Debit Balance	16 8 1	„ Hon. Secretary's Petty Cash Expenses ..	0 10 0
		„ Hon. Treasurer's Petty Cash Expenses ..	0 14 6
		„ Cheque Book	0 8 4
		„ Insurance (extra premium to November, 1941, 4s. 6d.; premium 3.11.41 to 2.11.42, 19s. 6d.)	1 4 0
		„ Printing	3 16 11
		„ Reporting	4 4 0
		„ Fee—Assessment of War Damage ..	2 2 0
		„ War Damage Insurance to 31.3.42 ..	11 5 0
	<u>£32 7 9</u>		<u>£32 7 9</u>
ASSETS, 1940-41.		SUSPENSE ACCOUNT.	
500 National Savings Certificates (Cost £400), Value 1941	£ 675 15 8	Members' Subscriptions for 1941	£ 16 16 0
£639 13s. 3d. 2½% Consolidated Stock (Cost £525 11s. 6d.), Value 10/11/41	526 2 3	Members' Subscriptions for 1940 (paid 194c) ..	2 2 0
Cash at Bank	£60 0 2	Member's Subscription (Sillman) paid in 1939 for 1940 and not refunded in 1940, but kept for 1941 subscription	1 0
Less Suspense Account	19 18 0		<u>£19 18 0</u>
Petty Cash in Hand:—	40 2 2		
Hon. Secretary	£1 9 11	EXCHANGE ACCOUNT.	
Hon. Treasurer	1 15 2	Librarian's Petty Cash returned	£0 9 2
Hon. Librarian	nil		
	<u>3 5 1</u>	LIABILITIES.	
	£1,245 5 2	Transactions, 1940.	
		Cost of Meeting, December 6th, 1941.	

This is to certify that we have examined the above Statement of Accounts and find it to be correct.

(Signed) SYDNEY B. NEWTON.
W. L. BONESS.
Hon. Auditors.

December 6th, 1941.

